

AI AUTOMOTIVE INDUSTRIES

AUTOMOTIVE and AVIATION MANUFACTURING
ENGINEERING • PRODUCTION • MANAGEMENT

SEPTEMBER 15, 1957

In This Issue

Chrysler's Equipment for Production of Torsion Bars
Automated Door Assembly Lines at Fisher Body Plant
Special Holding Fixtures for Machining Aircraft Parts
Details of Marvel-Schebler Fuel Injection System
GM Detroit Diesel Brings Out New Line of Engines
The Hamilton Turbocharged Free-Piston Engine

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A CHILTON PUBLICATION

NEW CAM OPERATED BORE-MATIC

provides
wide capacity range

for small to medium work

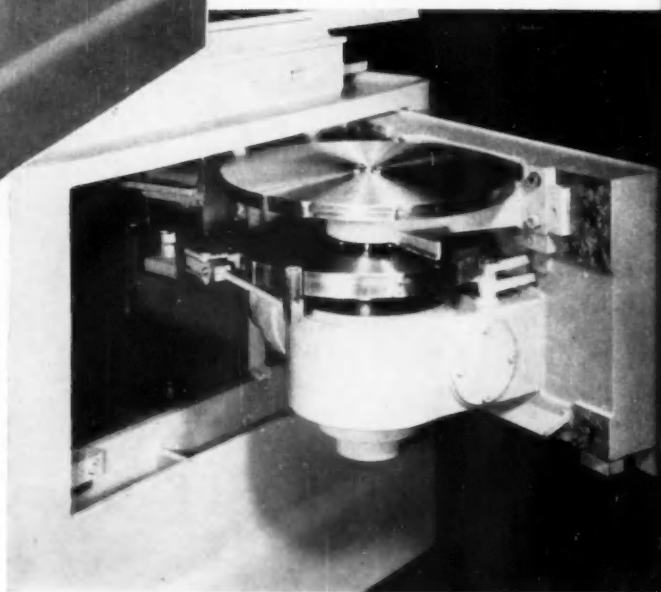


Heald Model 2215
Cam Operated Bore-Matic

| | |
|----------------------------|-------------|
| Table Stroke..... | 9" |
| Boring Stroke..... | 5" |
| Table Pad..... | 18" x 41" |
| Cross-Slide Stroke..... | 4" |
| Cross-Slide Table Pad..... | 13½" x 22½" |

Entire cam unit and drive swings out on hinged panel for easy access. Locating pads on panel and base assure positive location of cams at all times. Wipers clean cam surfaces just prior to contact point of cam and follower at which point continuous lubrication is applied.

THIS new addition to the Heald line is designed for continuous, high-production Boring of work where cam type operation and control are desirable. Table and cross-slide feeds are controlled by separate cams located in the machine base, each cam being so contoured as to provide the desired cycle. The cross-slide cam can also be arranged to operate cross-feed units or feed-out quills. By appropriate design of table and cross-feed cams, any combination of straight, taper or contour boring, turning, facing or grooving operations can be performed. For complete information, send for a copy of Bulletin 2-2215.



IT PAYS TO COME TO HEALD!

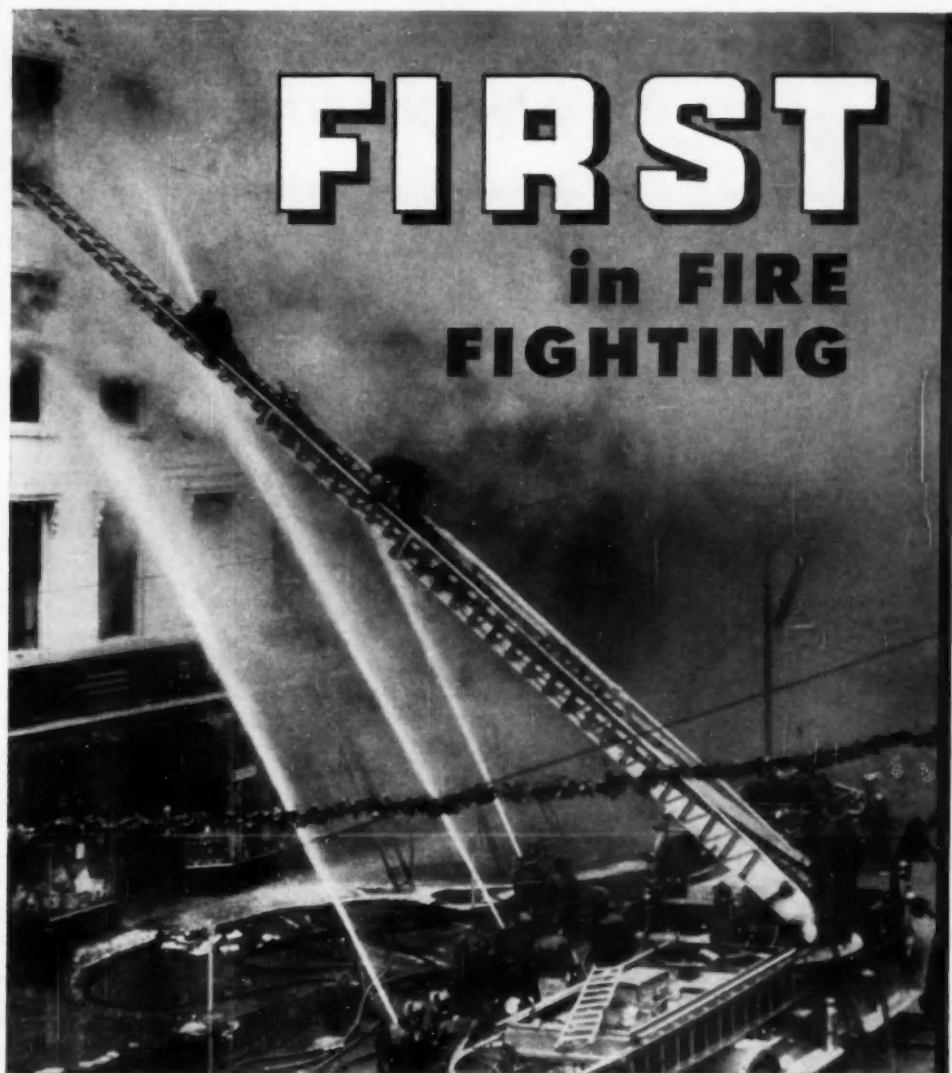
THE HEALD MACHINE COMPANY

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Chicago • Cleveland • Dayton • Detroit • Indianapolis • New York



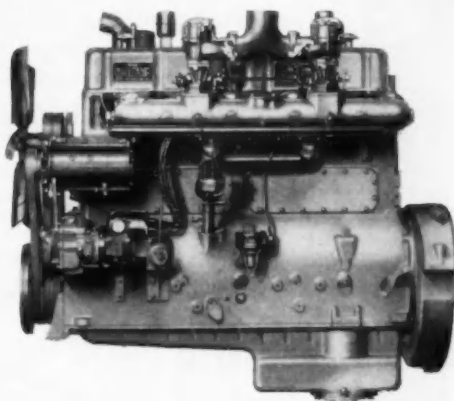


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in FIRE
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Model 145-GZB—270 hp range High-Output Fire Fighter—

Six cylinders, 5 $\frac{3}{8}$ -in. bore x 6-in. stroke, 817 cu. in. displ., with counterbalanced and vibration dampened 3 $\frac{1}{2}$ -in. 7-bearing crankshaft; dual downdraft carburetion; dual ignition; precision extra high capacity bearings; removable wet type cylinder sleeves, aluminum pistons, overhead valves with Stellite-faced exhaust valves and seats. Arranged for full electrical equipment and all modern accessories. Get Bulletin 1662.



Waukesha Motor Company, Waukesha, Wis., New York, Tulsa, Los Angeles

352

WAUKESHA FIRE FIGHTER ENGINES



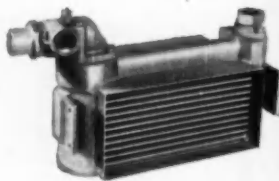
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COOL COMMANDER!



Harrison Cools Aero Design's Ultra-Modern Executive Transport!



Lightweight, heavy-duty Harrison oil cooler is in command of heat on the advanced Aero Commander.

New ideas in the sky . . . a new concept in airway travel! That's what this sleek, ultra-modern Aero Commander represents. It's fleet, maneuverable, comfortable . . . the ideal way to get there and *get there fast* for the modern business man. And it's Harrison that gets the cooling call on this popular new executive transport. Beating the heat for the most advanced aircraft is a Harrison specialty. It requires engineering skill, production know-how and the research facilities that you'll only find at Harrison. So remember . . . if you have a cooling problem, look to Harrison for the answer.

HARRISON RADIATOR DIVISION, GENERAL MOTORS CORP., LOCKPORT, N. Y.



TEMPERATURES
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AUTOMOTIVE INDUSTRIES

A CHILTON MAGAZINE PUBLISHED SEMI-MONTHLY

SEPTEMBER 15, 1957

VOL. 117, NO. 6

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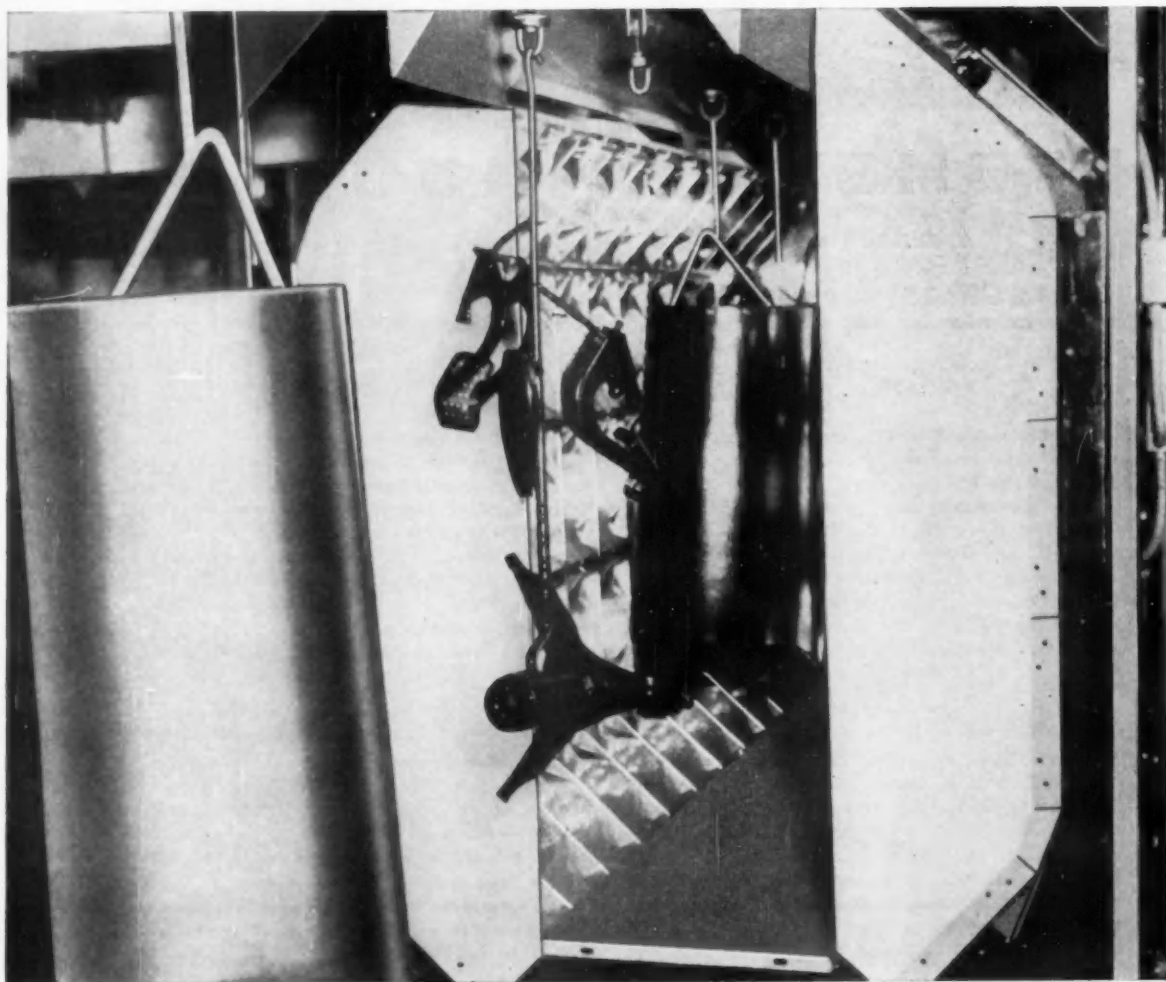
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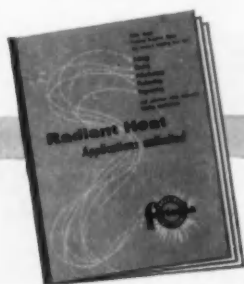


Eleven minutes is just long enough to save some money

International Harvester *knew* that radiant heat was fast, but they still got a happy surprise when they installed a Fostoria Oven: Before, they had dried cream separators in a convection oven. The thing took up *480 square feet* of floor space and needed a baking cycle of *one hour*. (We won't even mention the long warm-up time.)

That's when Fostoria came in with a specially designed radiant oven that cost less to buy, less to operate. It fits handsomely in IH's production line. It's only *eleven feet* long, and bakes a neat finish coat of enamel on the separators in just *eleven minutes*. You can just bet your old convection oven they're happy with it.

Your plant? The same thing would happen. Let us show you how.

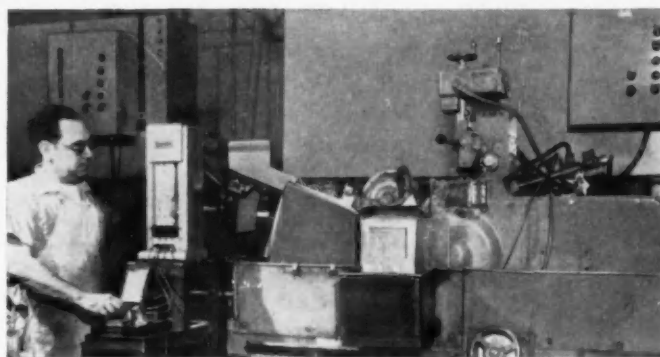
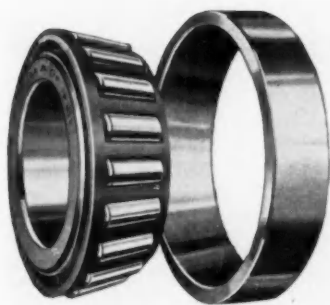
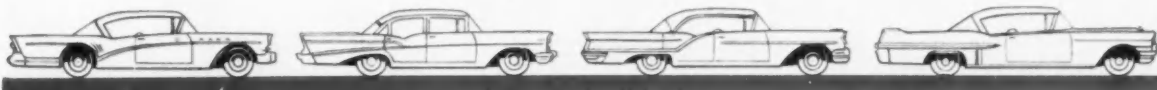


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*Nearly half of all
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trucks built today
have **HYATT Hy-Roll**
Tapered Bearings*

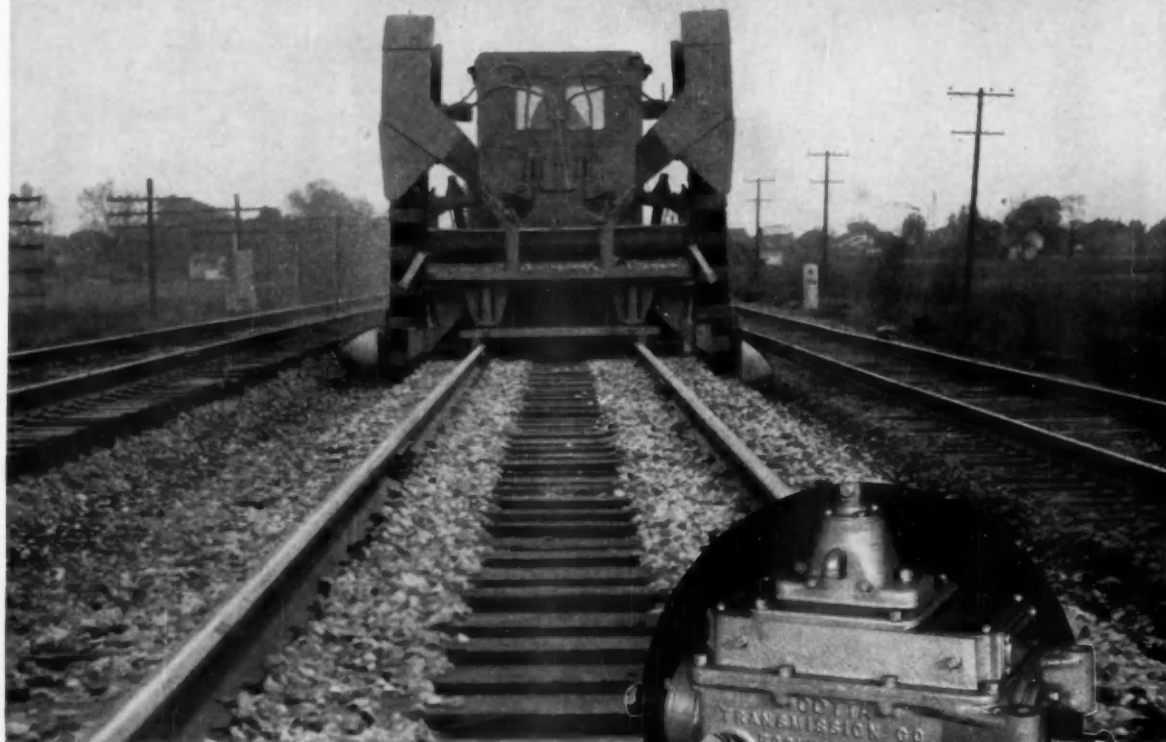
For decades, the name HYATT has stood for highest quality in roller bearings. Today, it means *even higher* quality—because now HYATT craftsmen have the last word in electronic controls to help them produce tapered bearings with *greater uniformity than ever before achieved in quantity production.*

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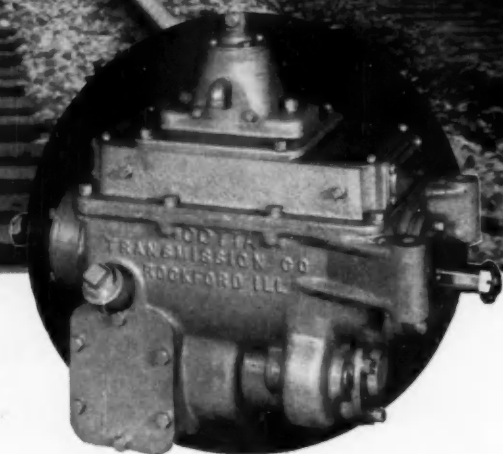
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used for added stamina



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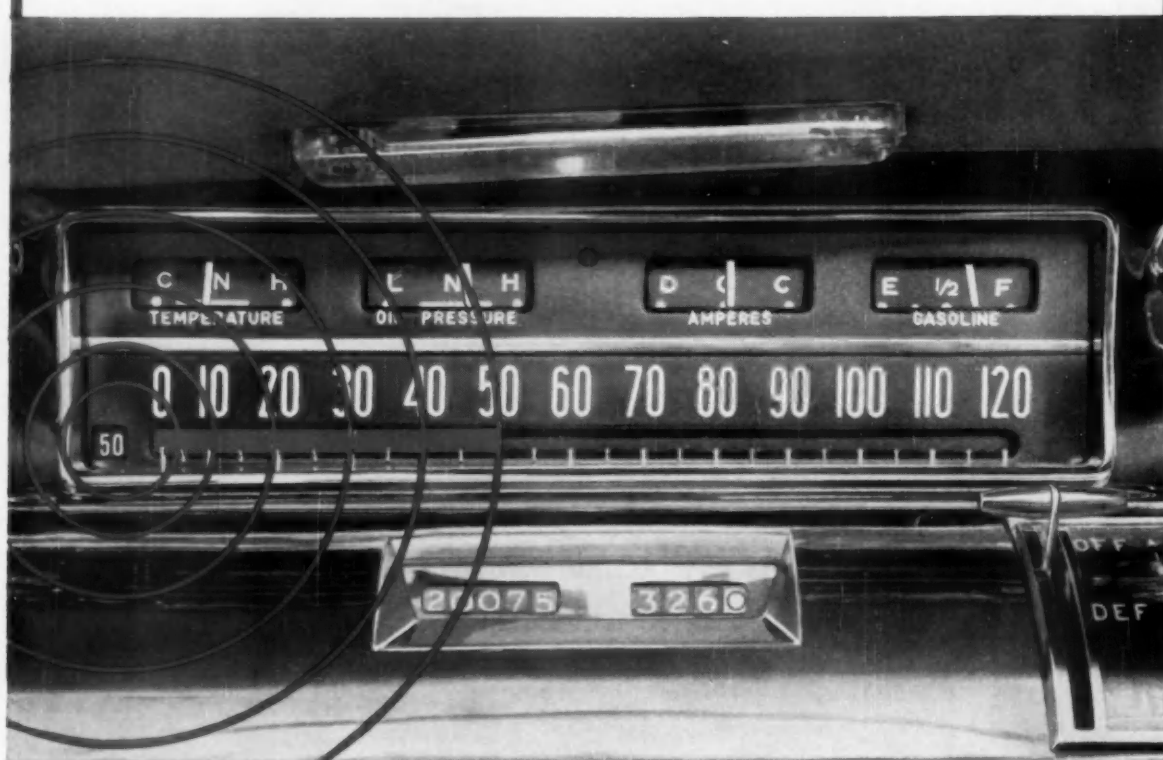
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ac puts the ac cent on service

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grew out of common shop talk.**



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Today, the automatic speed control—or AC's "Safety-Minder"—is standard equipment on all Buick Roadmasters, optional on other models.

This story is typical of AC's alertness and eager acceptance of new ideas. If you have a problem that calls for those qualities, and you want service action now, call AC!

What you have just read is one in a continuing series of **FACTUAL SERVICE STORIES** proving you can depend on AC for the facilities, the experience, the manpower and the desire to work with you in the solution of ordinary and extraordinary problems.



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Here's where it pays to

Play it Safe!



When you want reliability
... dependability ... specify
Steel Springs. Come to
Burton to get them!



Trucks, buses, trailers, off-highway equipment, and private motor cars of almost every prominent make use Burton Leaf or Coil springs as original equipment.

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COMA?



NO TIME FOR
RESEARCH?



WISH YOU HAD TAKEN UP
ANOTHER LINE OF WORK?

find your Spring problem...

NEW PRODUCT APPLICATION?



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OWN SPRINGS?

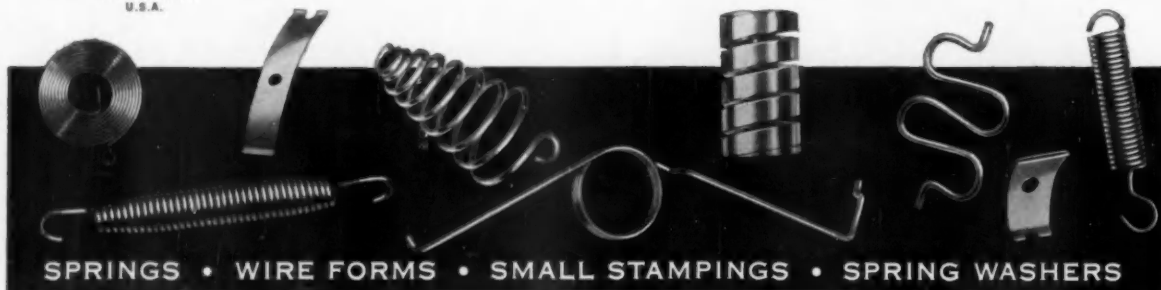


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SEVERE HEAT CONDITIONS?



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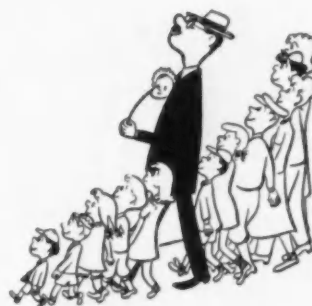


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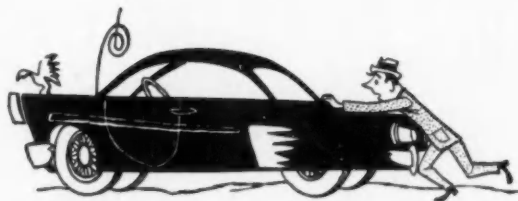


WORKING IN AN
UNFAMILIAR ELEMENT?

BECOMING IRRITABLE
AT ASSOCIATES?



USING TRIAL-AND-ERROR
METHODS?



NEW MODELS CREATING PERFORMANCE PROBLEMS?



NO PROBLEMS?
(LUCKY FELLOW)

FIGHTING
CORROSIVE
CONDITIONS?



HARASSED BY SPACE PROBLEMS?

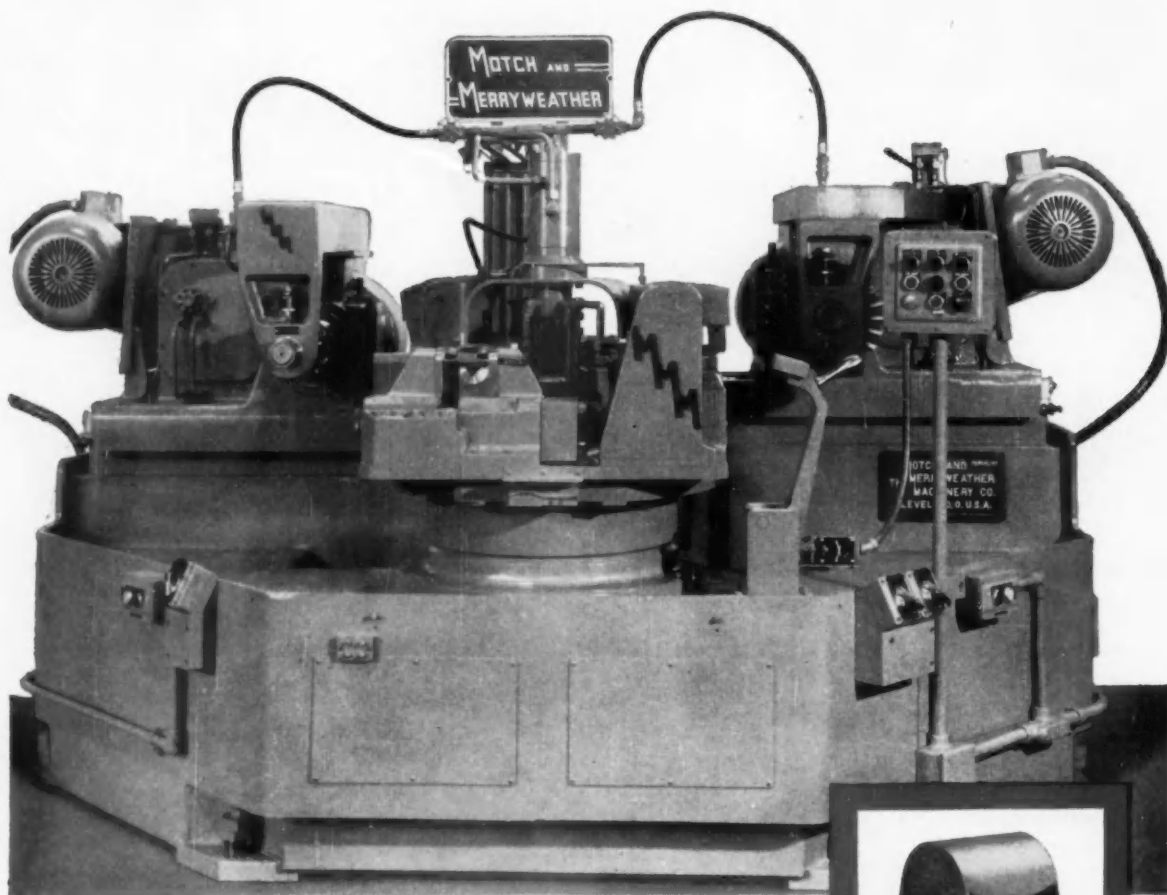
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Cycle—Either automatic or manual cycle. Cycle time, 64 seconds.

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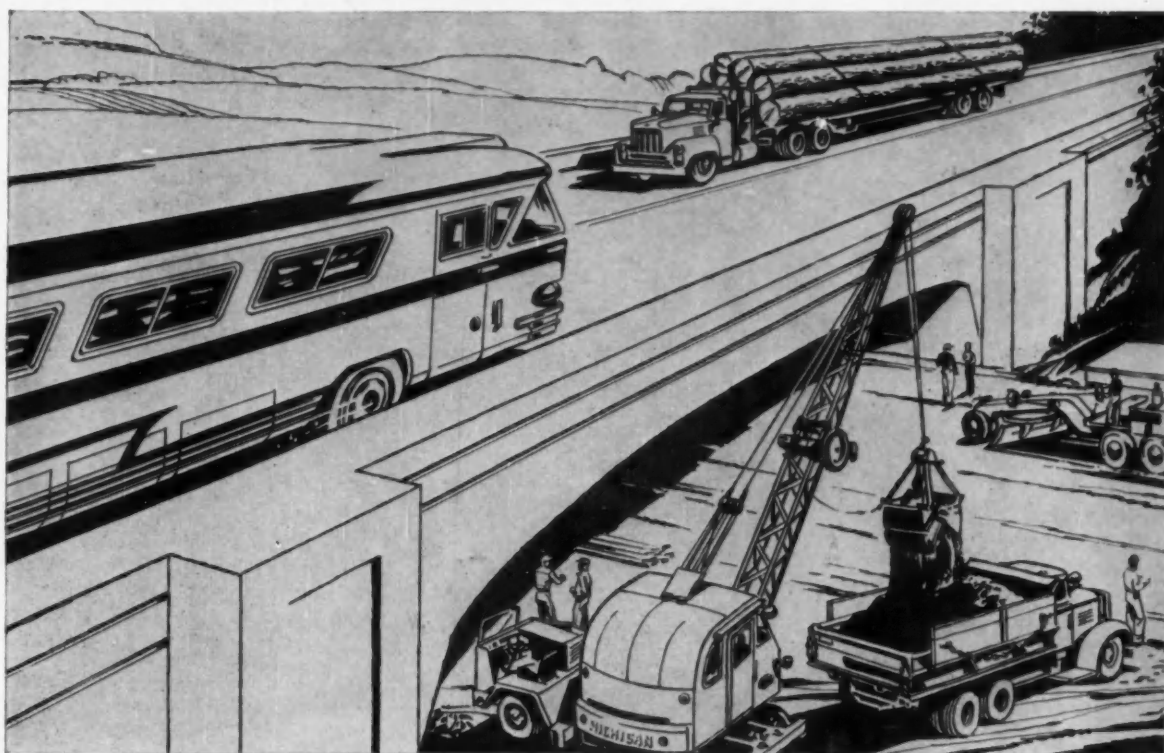
Fixtures—Four fixtures are mounted on index table.

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MACHINE TOOL MFG. DIVISION
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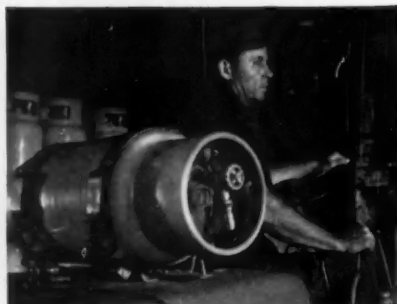
Here N-A-X FINEGRAIN steel proves its versatility, forming readily under the deep-drawing operation that pressure cylinder manufacturing requires. For 20-lb. cylinders, .086" N-A-X FINEGRAIN blanks, 21 1/4" in diameter, become 12" in diameter and 7 1/2" in depth after the drawing operation. Steel Cooperage Division produces cylinders up to 425-pound capacity.



Submerged arc welding operation joins the two cylinder sections together. N-A-X FINEGRAIN again demonstrates its weldability under any process.



Here cylinder pressure capacities are tested hydrostatically at 480 lbs. psi, after the fittings have been added. Final burst pressure—1650 lbs. psi.



Finished product on the job. This cylinder, meeting all specifications of I.C.C. code, Section 4BA, contains liquefied petroleum for materials handling truck.

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BUILDS IN STRENGTH

WITH LIGHT WEIGHT

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N-A-X Alloy Division, Dept. J-5

GREAT LAKES STEEL CORPORATION

Detroit 29, Michigan • Division of

NATIONAL STEEL CORPORATION

N-A-X Alloy Div., Dept. J-5

Great Lakes Steel Corp., Detroit 29, Michigan

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☐ Please have your representative contact me.

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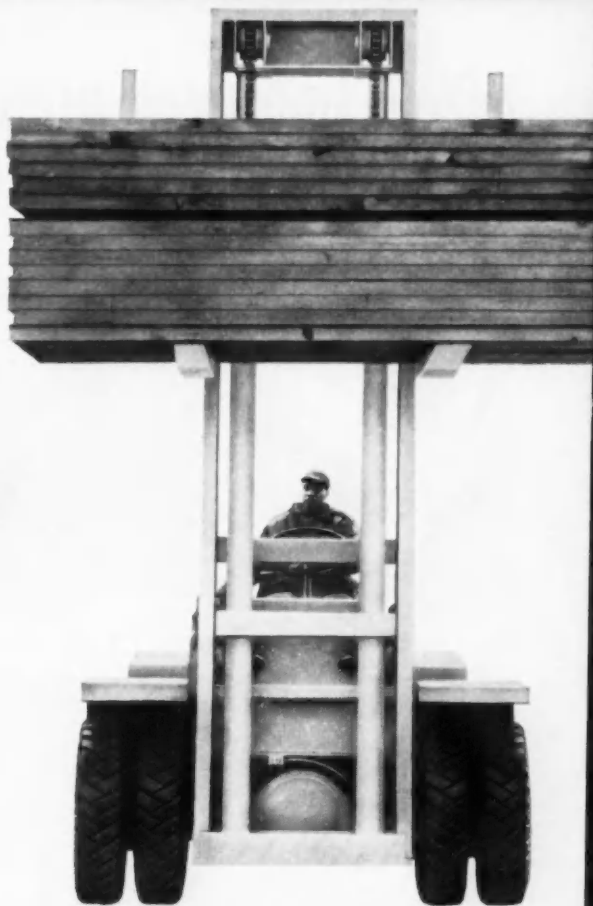
YALE*

*REG. U. S. PAT. OFF.

INDUSTRIAL LIFT TRUCKS AND HOISTS

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Warehouses • Hand Trucks • Hand and Electric Hoists



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- **For smooth lifting action:** Channels and carriage are mounted on roller bearings with side-thrust rollers. Lifting cylinders are ball mounted.
- **Your choice of Fluid Coupling or standard transmission.** Gasoline or LP-Gas powered models. Wide range of attachments—all engineered for a minimum loss distance.

The YALE & TOWNE Manufacturing Co.

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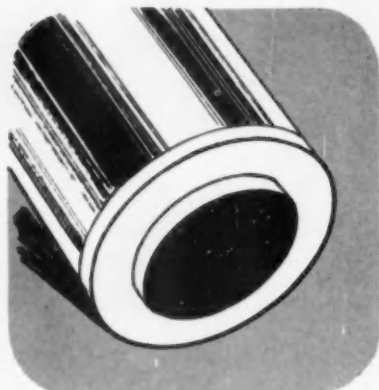
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Company _____

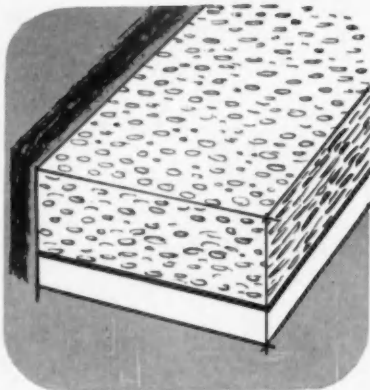
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City _____ Zone _____ State _____

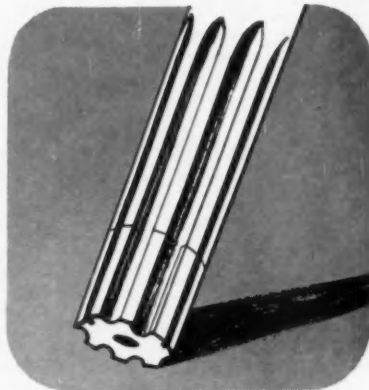
NOW—improved production through faster and better bonding with R/M Ray-BOND® Adhesives



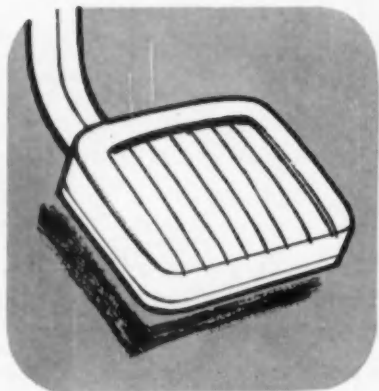
Butyl rubber foot to stainless steel tank



Synthetic foam to metal



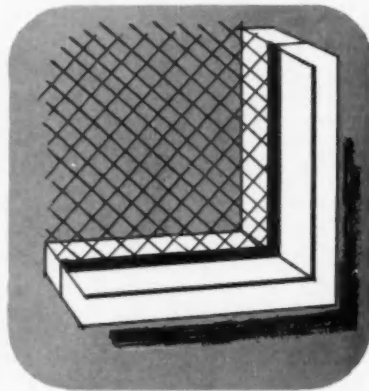
Ceramic tips to steel shanks



Natural rubber to clutch pedal



Etched "Teflon"* to steel



Rubber seals to stainless steel screens

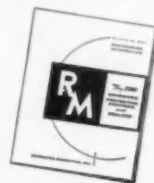
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R/M initiated the production of bonded assemblies more than 20 years ago. Over the years we have acquired a wealth of experience that can help you cut costs and simplify operations in innumerable bonding applications. Call on our engineers to work with you in developing adhesives, protective coatings, and sealers to meet your specific requirements. Adhesives Department, RAYBESTOS-MANHATTAN, INC., Bridgeport, Conn.



Send for free copy of R/M Bulletin No. 650A, containing engineering information on Ray-BOND adhesives, protective coatings, and sealers.

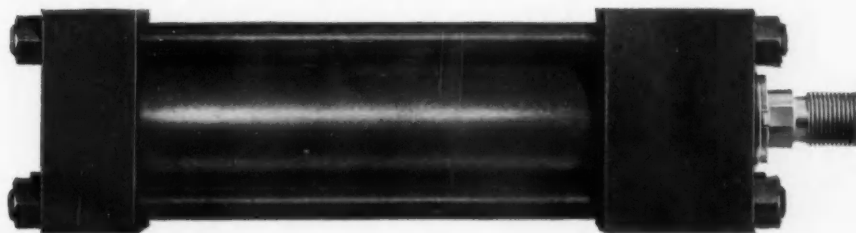


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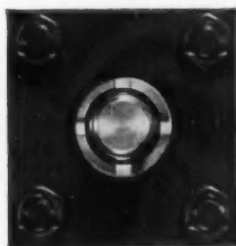
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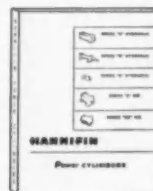
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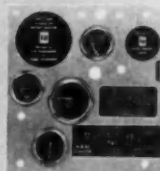
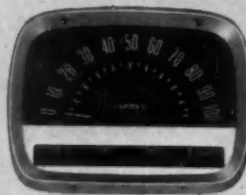
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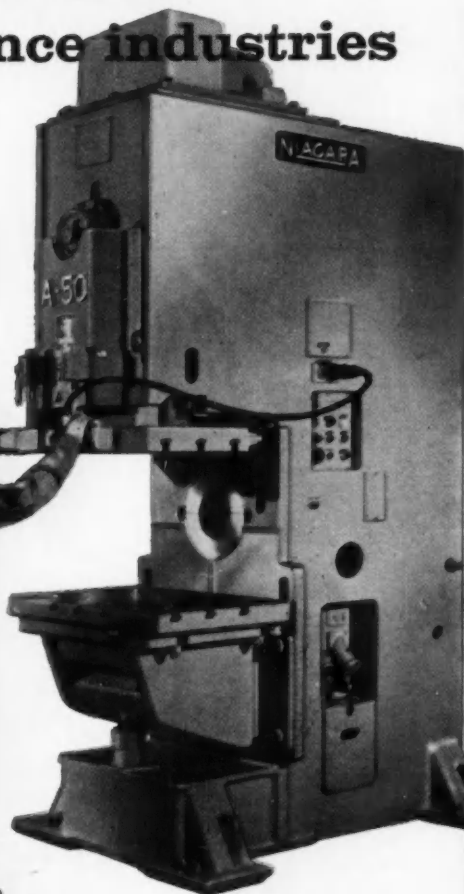
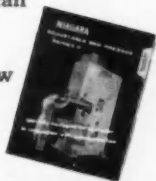
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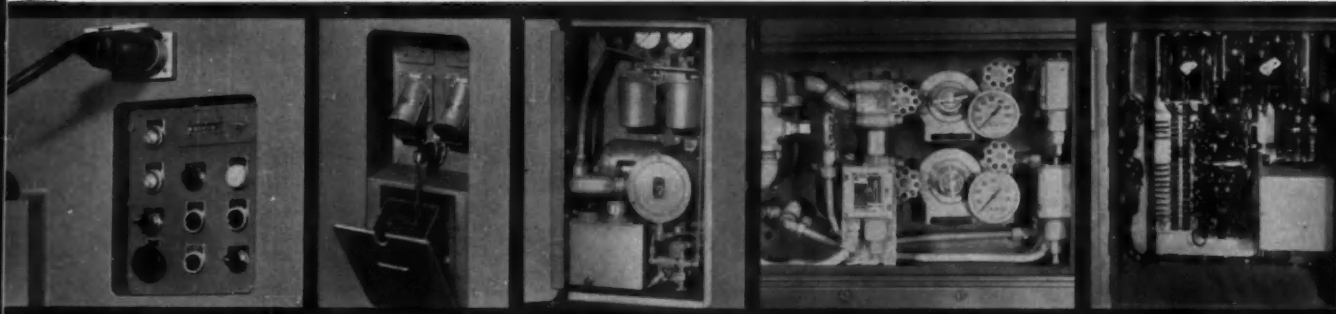
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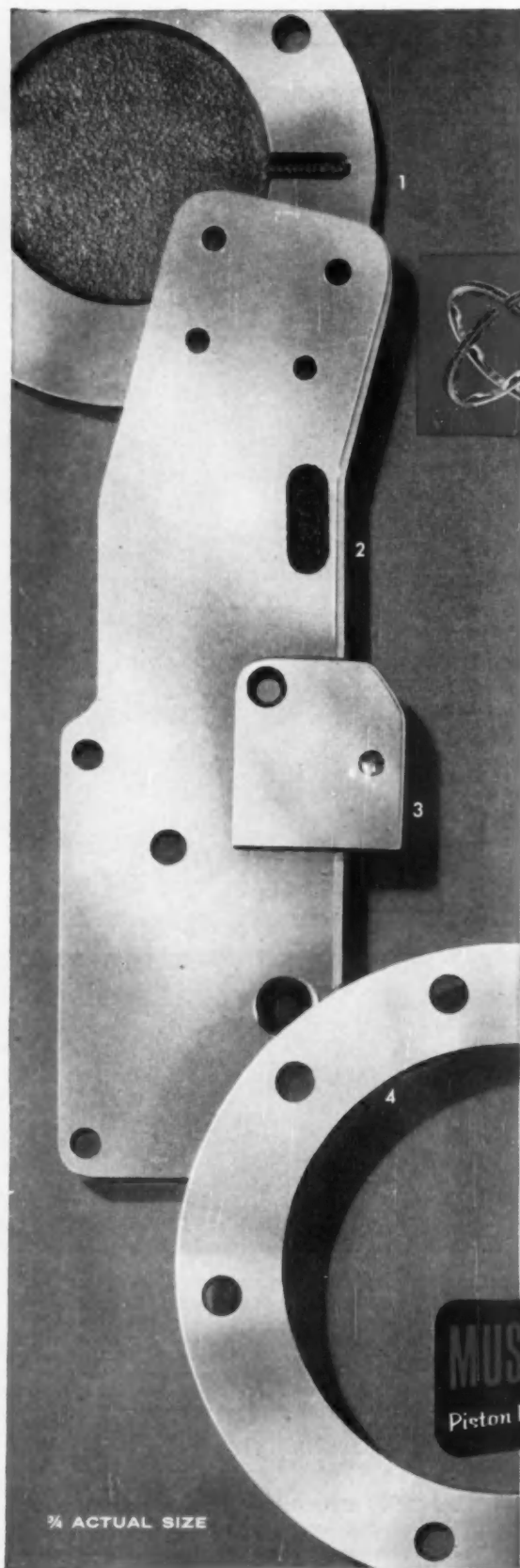
COMB. MOTOR & PRESS CONTROL in dust-tight enclosure flush mounted in rear frame, houses disconnect switches, circuit protection, transformers, fuses, control relays and starters for main motor and lubrication pump.

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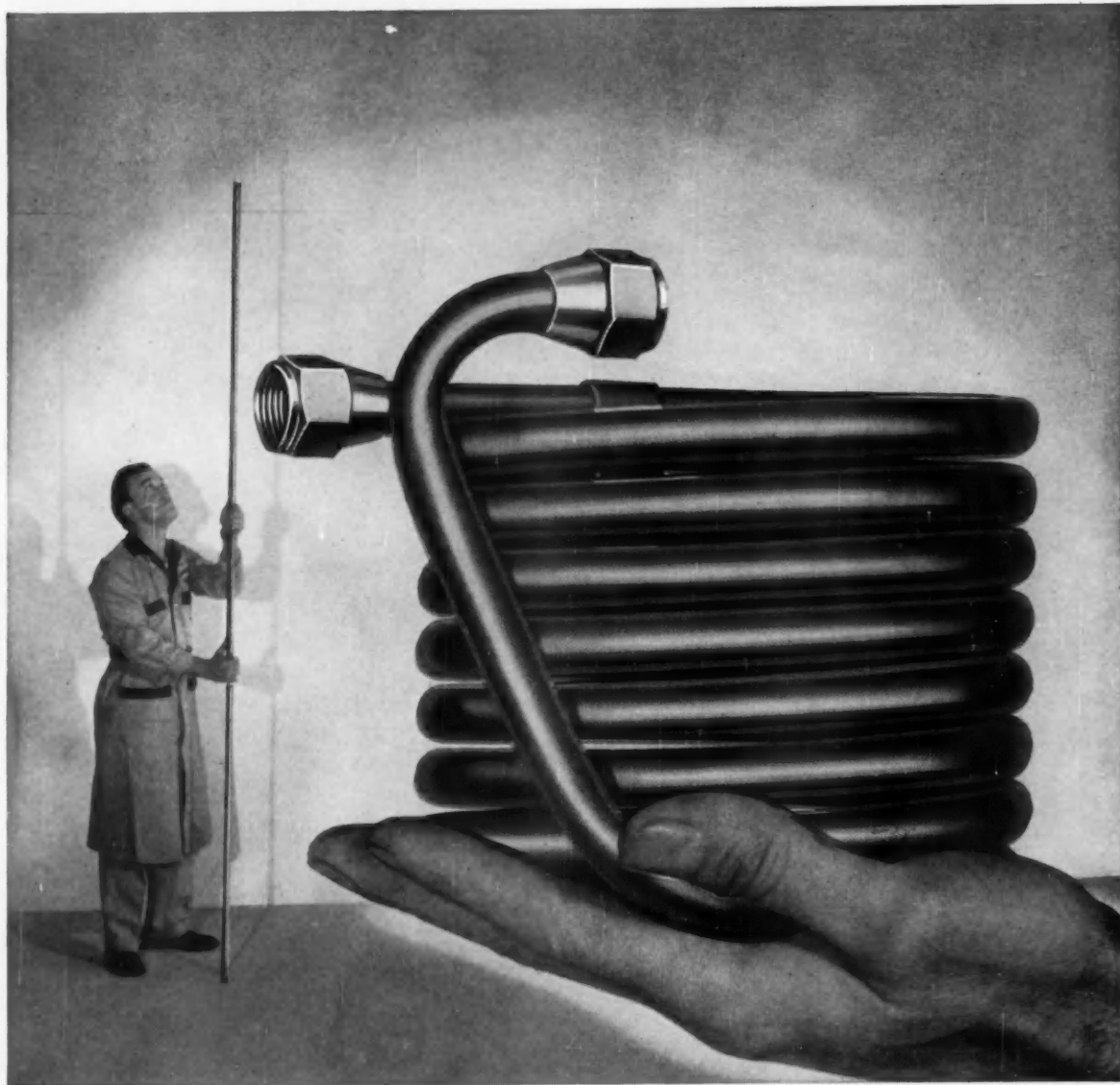
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Over 11 feet of ductile Bundyweld



Oil cooler for power-steering unit stands only $4\frac{3}{4}$ " high, yet contains over 11 feet of $\frac{1}{2}$ " x .035 Bundyweld Tubing. The inside diameter of the coil measures just 4.88". This I.D. dimension is held to $\pm\frac{1}{8}$ " tolerance. Ends are double-flared with fittings attached.

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Bundyweld starts as a single strip of copper-coated steel. Then it's . . .



continuously rolled twice around laterally into a tube of uniform thickness, and



passed through a furnace. Copper coating fuses with steel. Result . . .



Bundyweld, double-walled and brazed through 360° of wall contact.



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NOTE the exclusive Bundy-developed beveled edges, which afford a smoother joint, absence of bead, and less chance for any leakage.

SIZES UP TO $\frac{3}{8}$ " O.D.

go into oil cooler just 4³/₄" high

Vital cooling coil for power-steering pump is precision-made with all fittings attached by Bundy's efficient fabrication facilities

This was the problem: cool the oil for a heavy-duty, hydraulic-power-steering pump; do it in limited space.

Working together, Eaton Manufacturing Company and Bundy® engineers found the answer: surround the hydraulic reservoir with a 4³/₄"-high cooling coil of Bundyweld® Tubing. Result: as hydraulic fluid is pumped through over 11 feet of tubing, its temperature drops 25° to 35°F.

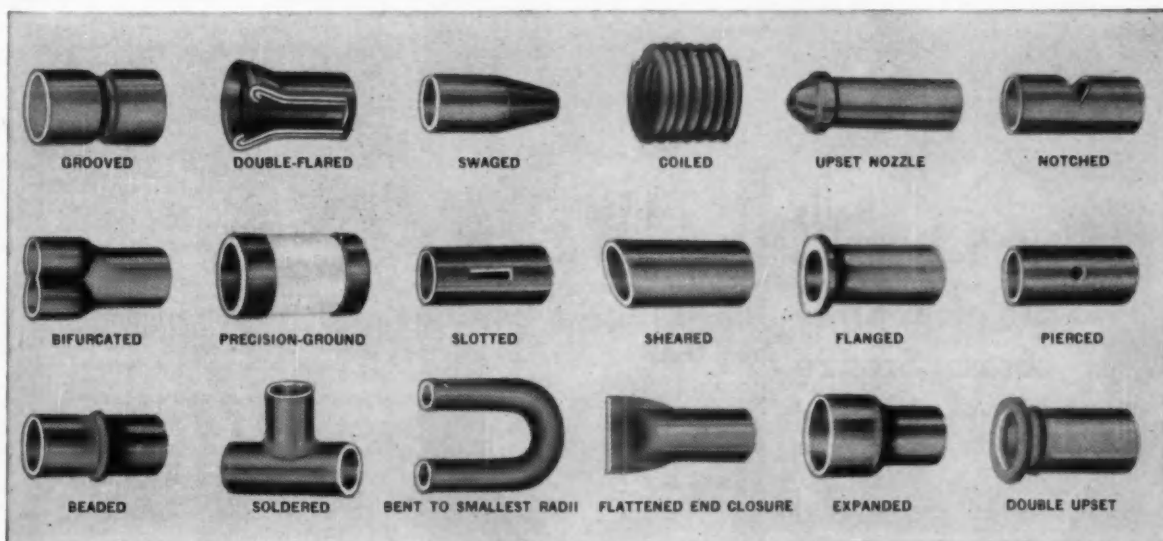
Bundy's skilled operators fabricate the oil cooler—assemble the fittings, double-flare the tubing ends, and coil the tubing. Tough fabrication jobs like this one look easy with highly versatile Bundyweld Tubing.

Made by the exclusive process shown below, left, Bundyweld has high tensile strength, bursting strength, and resistance to vibration fatigue . . . is smooth, ductile and easy to fabricate. Bundyweld is the safety standard of the automotive industry . . . is used on 95% of today's cars, in an average of 20 applications each.

If you need tubing for mechanical or fluid-transmission applications on cars, trucks or farm equipment, Bundy offers all this: free, expert engineering service; high-quality tubing in coils up to 2,000 feet . . . or fabricated to your specifications. You'll find it pays to contact Bundy first. Call, write or wire us today.

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Shown above are but a few of the fabrication operations which are possible with Bundyweld Steel Tubing. Many of these, and others not shown, were developed through solving a specific

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CALENDAR OF COMING SHOWS AND MEETINGS

- American Machine Tool Distributors Association, annual meeting, Hotel Cleveland, Cleveland, O. Sept. 22-24
- ASME Petroleum Mechanical Engineering Conference, Mayo, Tulsa, Okla. Sept. 22-25
- Standard Engineering Society, annual meeting, Hotel Commodore, New York, N. Y. Sept. 23-25
- ASME Fall Meeting, Statler Hotel, Hartford, Conn. Sept. 23-25
- Material Handling Institute, Joint-Industry fall meeting, Greenbrier Hotel, White Sulphur Springs, W. Va. Sept. 30-Oct. 1
- SAE National Aeronautic Meeting, Production Forum, and Engineering Display, Hotel Ambassador, Los Angeles, Calif. Oct. 1-5
- International Automobile and Motorcycle Show, Paris, France Oct. 3-13
- National Electronics Conference, Hotel Sherman, Chicago, Ill. Oct. 7-9
- ASLE-ASME Lubrication Conference, Royal York Hotel, Toronto, Ont., Canada Oct. 7-9
- American Institute of Electrical Engineers, fall general meeting, Morrison Hotel, Chicago, Ill. Oct. 7-11
- Gray Iron Founders' Society, annual meeting, Drake Hotel, Chicago, Ill. Oct. 9-11
- ASME - AIME Fuels Conference, Chateau Frontenac, Quebec, Canada Oct. 10-12
- Pressed Metal Institute, annual meeting, Castle Harbor, Bermuda Oct. 13-17
- AIEE Feedback Control Conference, Chalfonte-Haddon Hall, Atlantic City Oct. 16-18
- International Motor Show, Earls Court, London, England Oct. 16-26
- National Conference on Industrial Hydraulics, Hotel Sherman, Chicago, Ill. Oct. 17-18
- Magnesium Association, 13th annual meeting, Biltmore Hotel, New York, N. Y. Oct. 17-18
- ASME Power Conference, Americus Hotel, Allentown, Pa. Oct. 21-23
- Computer Application Symposium, Hotel Sherman, Chicago, Ill. Oct. 23-24
- National Machine Tool Builders' Association, annual meeting, French Lick-Sheraton Hotel, French Lick, Ind. Oct. 23-25
- American Society of Body Engineers, annual technical convention, Rackham Bldg., Detroit, Mich. Oct. 23-25
- American Gear Manufacturers Association, semi-annual meeting, Edgewater Beach Hotel, Chicago, Ill. Oct. 28-30
- National Industrial Packaging & Handling Exposition, Convention Hall, Atlantic City, N. J. Oct. 28-31
- National Metals Exposition and Congress and Second World Metallurgical Congress, International Amphitheatre, Chicago, Ill. Nov. 2-5
- SAE Transportation Meeting, Hotel Statler, Cleveland, O. Nov. 4-6
- American Institute of Electrical Engineers, ninth annual Machine Tool Conference, Hotel Schroeder, Milwaukee, Wisc. Nov. 4-6
- SAE Diesel Engine Meeting, Hotel Statler, Cleveland, O. Nov. 5-6



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High Spots of This Issue

▼ Chrysler's Setup for Making Torsion Bars

The Detroit Forge Plant on Lynch Road is the site where torsion bars for the front suspension of Chrysler Corp. cars are produced. Detailed in this report is the present arrangement of operations and the compact layout of equipment. See Page 48.

▼ Automated Door Assembly Lines at Fisher Body Plant

Every proposed application of automation at Fisher Body is given careful prior study to determine its feasibility. Its extensive use in door assembly was found more than justifiable from the viewpoint of volume, as will be seen here. Page 56.

▼ Special Holding Fixtures for Machining Aircraft Parts

Presented here is a pictorial description of the removal of 89 per cent of a billet to make an important aircraft part at the Tulsa Div. of Douglas Aircraft Co. A total of 27 operations are required to accomplish this end. Page 60.

▼ Fourth Annual Bendix Aircraft Ignition Conference

Nearly 200 persons were in attendance at the recent Aircraft Ignition Conference conducted in Sidney, N. Y., by Scintilla Div. of Bendix Aviation Corp. Important engineering developments are reviewed in this report of the meeting. Page 66.

▼ The Evolution of Automotive Finishes

Performance requirements for automotive finishes are of necessity quite severe. The author reviews in this article a history of the various techniques that have been developed and forecasts what may be expected in the years ahead. Page 72.

▼ 40 New Product Items And Other High Spots, Such As:

Hamilton free piston engine; Marvel-Schebler fuel engine system; new Detroit Diesel engines; Ross HPS power steering gear; improved Fruehauf tandem under-constructions; new Dow Corning Laboratory; new device for control of vehicle speeds; and selected equipment on passenger cars.

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"Here's a hot one for the slitters

60,000 lbs. of slit coils ... delivered early tomorrow!"

A TRUE STORY of Ryerson service—the kind that makes Ryerson your best source for every steel requirement.

It was ten after five. The phone rang and a steel buyer 80 miles away said: "I've simply got to have 60,000 lbs. of slit coils first thing in the morning."

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Not at Ryerson. This kind of service is what Ryerson customers have learned to count on when emergencies arise.

The needed steel was on hand in Ryerson stocks. Unequalled slitting equipment was put to work. And during the night two different gauges of steel

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News

OF THE AUTOMOTIVE AND AVIATION INDUSTRIES

Vol. 117, No. 6

September 15, 1957

Industry Interest Mounts In U. S. Small Car Market

Although most spokesmen for the automobile industry hesitate to predict the future of the small car in America, several recent developments indicate that the companies are concerned about inroads made by cars shorter and less spacious than standard U. S. models.

S-P, satisfied with sales of its low-priced Scotsman model, is planning to market a small German car beginning this fall. The small car is said to be the Goggomobil, which is not manufactured by S-P's German affiliate, Daimler-Benz, but by Hans Glas gMBh of Dingolfing, Germany.

American Motors, of course, has been quite outspoken in proclaiming confidence in the Rambler. In fact, AMC is returning to the 100-in. wheelbase Rambler in '58 as evidence of this confidence. The small car, incidentally, generally is considered to be 100-in. wheelbase or less.

Others have shown faith in Rambler. AMC recently revealed that more than 100 Big Three dealers have been signed to sell Rambler in 1958. Many of these are Oldsmobile dealers, most of them are small-town or rural dealers. GM's other medium price divisions, Pontiac and Buick, are distributing European GM cars. Pontiac is handling the English Vauxhall, and Buick the German Opel.

Ford Motor Co. recently announced an expanded dealer organization to handle the English Ford, also a small car, in 1958. Chrysler Corporation has made no announcement of its plans in this field, but the company reportedly is working toward a program for 1958.

Imports of foreign made small cars have increased this year, and importers, including the U. S. companies, anticipate a further increase



HILLMAN MINX INTRODUCES 1958 JUBILEE

Hillman Minx for 1958, designated Jubilee, features Manumatic transmission as optional extra with two-pedal control and manual gear shifting. Engine torque at low rpm is raised by new cam profiles which give a maximum of 72 lb/ft at 2200 rpm instead of 69.75 at 2400 rpm as before. Same peak output of 51 hp is now reached at 4400 rpm as against 4600. Several styling refinements have been added to the car.

in 1958. Observers believe, however, that the market would have to grow considerably before domestic manufacturing would be economical and feasible.

Chrysler Looks to '58 Models For Another Successful Year

Chrysler Corp. begins the second year of its "Forward Look" this month, and is looking forward to a year as successful as the first. Production of all 1958 models is scheduled to be under way by the last part of September.

Total U. S. production of Chrysler cars for the 1957 model year was approximately 1,213,100 units, the third highest model year on record, and well above the 999,383 built during the previous model year.

Through August, Chrysler's share of the total market for this year was 21.3 per cent, compared with 15 per cent for the same eight-month period a year ago. While the industry was boosting its output 7.2 per cent during that period, Chrysler jumped its production a healthy 51.6 per cent.

W. C. Newburg, group vice president-automotive, estimated divisional production for the model year as follows: Plymouth, 662,800; Dodge, 280,800; DeSoto, 117,500; Chrysler, 116,000; and Imperial, 36,000.

One of the outstanding gains made by Chrysler this year has been with the Imperial, which has emerged as a separate car and has been closing in steadily on Lincoln. E. C. Quinn, Chrysler Div. president, said he believes that Imperial can overtake Lincoln and holds its lead for the remainder of the calendar year.



FIRESTONE DEVELOPS HUGE ALL-SYNTHETIC TIRE

The largest synthetic tire ever manufactured by Firestone Tire & Rubber Co.—size 24.00-25—lies in the mold where it was formed ready to be removed by a workman. Made of 100 per cent Coral rubber, a synthetic developed by Firestone, it and three other tires were presented recently to the Army for testing.

Use of Aluminum Will Increase During 1958 Automobile Year

The automobile industry will use some 13-15 per cent more aluminum for 1958 passenger cars, with four new decorative applications for aluminum and greater use of the metal in nine other trim applications. A higher rate of installation of automatic transmission and power assists, industry-wide introduction of air suspension, and a switch by one company to aluminum timing chain covers also will be important factors in the aluminum boost.

Reynolds Metals Co. predicts that the average 1958 passenger car will contain 47-49 lb of aluminum, up about 5 lb from current models. Figuring on scrap and waste as well as the metal used, and basing its calculations on a 6.5 million car year, Reynolds forecasts total industry requirements will approach 400 million lb.

New trim applications for aluminum include wheel cover trim, tail lamp body, door inner panel trim and bumper trim. Prior to 1958 models, these four parts were not alumi-

num on any car, as far as is known.

Biggest area of switch is in grilles, with seven additional makes planning aluminum grilles for '58. Currently only Cadillac, Chevrolet, Chrysler, DeSoto, Imperial and Plymouth use aluminum grilles. Other places where manufacturers are switching to aluminum include body side trim, headlight bezels and doors, scuff plates, seat skirts and inserts, and seat back trim.

In functional parts, the poundage increase will result from higher installation rate of options that include aluminum components, the relatively heavy timing chain covers used by three makes, and the introduction of air suspension on a wider scale.

One more car is joining Chevrolet and Corvette with aluminum intake manifold, although on just one model. Buick, which offered aluminum brake drums on its top model in 1957, is expected to make the option available on all models. One manufacture is planning an automatic transmission that will have aluminum bell housing, case and valve bodies in a single cast piece.

Air suspension will use aluminum

for compressor piston case and cover, leveling valves, and perhaps for the bellows base. Cadillac currently uses steel bases for its bellows, but may switch to aluminum.

Reynolds believes that aluminum radiator heat exchangers, axle housings and wheels are two to five years away from production, although developmental work is proceeding in these fields as well as in body panels, engines and additional trim.

Edsel Div. Announces Suggested List Prices

Suggested list prices for the 1958 Edsel car, Ford Motor Co. entry in the medium-price field, were announced by Richard F. Krafve, vice-president of Ford and general manager of Edsel Div. Prices run from \$2300 for the Ranger two-door sedan to \$3489 for the Citation convertible. These prices do not include taxes, transportation, license or handling and preparation charges.

Edsel includes Teletouch automatic transmission as standard equipment on the two top series, Corsair and Citation. Standard on all models are dual headlights and self-adjusting brakes. Suggested list price for the Citation convertible with seven factory-installed options is \$3954.20.

EDSEL PRICES*

| Ranger Series | |
|------------------------------------|----------|
| Two-Door Sedan | \$2,300 |
| Four-Door Sedan | 2,366 |
| Two-Door Hardtop | 2,367 |
| Four-Door Hardtop | 2,446 |
| Pacer Series | |
| Four-Door Sedan | \$2,499 |
| Two-Door Hardtop | 2,564 |
| Four-Door Hardtop | 2,618 |
| Convertible | 2,771 |
| Corsair Series | |
| Two-Door Hardtop | \$3,066 |
| Four-Door Hardtop | 3,139 |
| Citation Series | |
| Two-Door Hardtop | \$3,242 |
| Four-Door Hardtop | 3,316 |
| Convertible | 3,489 |
| Station Wagons | |
| Roundup (six pass.) Two-Door... | \$2,630 |
| Villager (six pass.) Four-Door... | 2,683 |
| Villager (nine pass.) Four-Door... | 2,736 |
| Bermuda (six pass.) Four-Door... | 2,922 |
| Bermuda (nine pass.) Four-Door... | 2,975 |
| Options, Accessories | |
| Automatic Transmission— | |
| lever control | \$202.30 |
| Automatic Transmission— | |
| Teletouch drive | 215.00 |
| Dial-temp heater and defroster... | 86.85 |
| Power Brakes | 35.55 |
| Power Seats | 71.05 |
| Power Steering | 78.95 |
| Power Windows | 93.75 |
| Radio | 88.45 |
| Windshield Washer | 10.60 |

* Suggested factory list prices, excluding Federal excise, state, and local taxes, and delivery and handling charges.

Pontiac Lists Vauxhall Price; Buick Reveals Opel Car Data

Pontiac Div. has announced three port of entry prices for the Vauxhall Victor Super now being sold by Pontiac dealers, and Buick Div. has revealed specifications of the German built Opel cars its dealers will sell.

Vauxhall list prices, exclusive of taxes and destination, delivery and handling charges, are \$1812.50 at New York, \$1881.36 at Detroit and \$1994.64 at San Francisco. These prices include heater and defroster, directional signals, electric windshield wiper, and oil bath air cleaner.

Vauxhall is built at Luton, England by GM. The car has a 98 in. wheelbase, overall length of 166.2 in. and roof line height of 58 in. It is powered by a four-cylinder, 92 cu in. overhead valve engine with a compression ratio of 7.8:1 and bhp rating of 54.8 at 4200 rpm. Curb weight is 2150 lb. Vauxhall is a four-door sedan with integral frame construction.

With a panoramic windshield and a wraparound rear light, the Vauxhall has a total glass area of 18.5 sq ft. Independent front suspension is of coil springs with stabilizer bar, while rear suspension is with 48-in. leaf springs.

Buick dealers will sell two models of the Opel. The Olympia Rekord is on sale this month at selected dealers, and the Caravan will be available in November when shipments arrive. The cars are built by Adam Opel A.G. Div. of GM at Russelsheim, Germany.

Both models have the same engine: four-cylinder, 45-hp engine with 90.8 cu in. displacement and compression ratio of 6.9:1. Wheelbase is 100.04 in., overall length is 174 in., and width is 64 in. The Rekord weighs 1995 lb and is 59 in. high; the Caravan weighs 2160 lb and is 62 in. high.

The Rekord is a two-door sedan, the Caravan a two-door station wagon. Standard equipment on both models includes heater and defroster, oil bath air cleaner, clock, cigar lighter, turn signals and sun visors.

Harley-Davidson Will Enter Motor Scooter Field in '59

Harley-Davidson Motor Co. is preparing to enter the motor scooter field in 1959. The company currently makes only full-size motorcycles and accessories. Meanwhile, Harley-Davidson plans to double the size of its plant at Butler, Wis., and consolidate all operations there, closing its present Milwaukee plant.



1958 OPEL MAKES AMERICAN DEBUT THIS FALL

Scheduled for introduction in the U.S. this fall are the 1958 Opel Olympia Rekord, a two-door sedan, and the 1958 Opel Caravan, a two-door station wagon. Both cars are completely restyled. The Rekord has an entirely redesigned all-steel body, with a sloping alligator-type hood, and new front and rear suspension systems with telescopic shock absorbers. The Caravan has a rear passenger seat which folds forward to make room for cargo. Load space is nearly 6 ft long, 4½ ft wide, and 3 ft high.

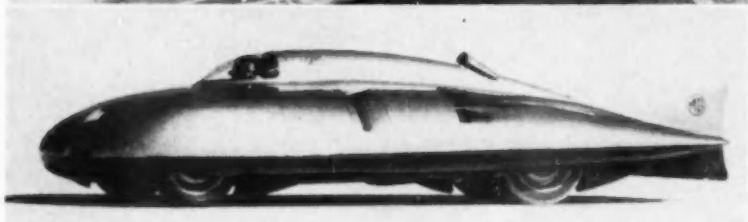
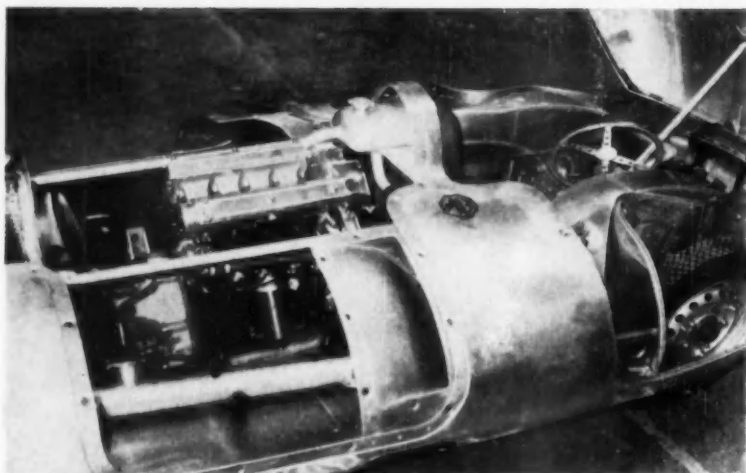


RUSSIAN BUS HAS FOUR-CYLINDER L-HEAD ENGINE

This ten-passenger Russian bus, built on the chassis of a Pobeda car, is now being produced at the Riga Bus Body Plant. Design features include semi-forward control and a large glass area. Basic vehicle is powered by a four-cylinder L-head engine rated at 52 hp at 3600 rpm.

News

AUTOMOTIVE AND AVIATION.



BRITISH MG ESTABLISHES NEW SPEED RECORD

Small experimental MG driven by Stirling Moss established a new record of 245.11 mph for the two-way mile on the Utah Salt Flats. The British Motor Corp.'s basic 91.5 cu in. four cylinder engine is supercharged and fitted with a twin overhead camshaft. Output is reported to be about 240 bhp at 7000 rpm. It is middle-axle-mounted behind the cockpit, and drives through a standard four-speed transmission. Dimensions are: wheelbase, 96 in.; front tread, 42 in.; rear, 30 $\frac{3}{4}$ in.; overall length, 181 $\frac{1}{2}$ in.; width, 64 $\frac{1}{2}$ in.; and height, 38 $\frac{1}{4}$ in.



PRIME MOVER POWERED BY 165-HP DIESEL ENGINE

Two-wheeled prime mover made in Minsk, Russia, drags a 13-cu yd scraper trailer at speeds up to 25 mph. Designated MAZ-529, the vehicle is powered by a 165-hp Diesel engine. The combination weighs 35 tons.

Seven Ford Plants To Operate With Start of 1958 Production

Beginning with 1958 model production, seven new Ford Motor Co. plants are going into operation on at least a part-capacity basis. The Lincoln Div. factory at Novi, Mich., already is producing and Mercury's new Los Angeles assembly plant is scheduled to begin production of Mercury and Edsel cars this fall.

The other five plants, all manufacturing facilities, are at Sheffield, Ala., Nashville, Indianapolis, Rawsonville, Mich., and Lima, O. Other projects under construction, and slated for later completion, include an office building in Dearborn, five engineering buildings, an automatic transmission plant at Sharonville, O., a parts depot near Philadelphia, and a Ford Div. assembly plant near Lorain, O.

The Sheffield plant (220,000 sq ft) will build aluminum automatic transmission and engine parts. The Nashville plant (1.1 million sq ft) will make glass. At Indianapolis (1.4 million sq ft), the General Products Div. will produce steering gear units and cold formed parts. The Rawsonville plant (800,000 sq ft) will produce parts for the Accessory Div. and the Lima plant (1.1 million sq ft) is a new Engine Div. facility and will make engines.

Total investment since World War II for new plants, modernization, expansion and tooling will top \$4 billion when current projects are completed by the end of next year. Of the total expenditure, some \$2.89 billion will cover plants and facilities and \$1.29 billion will be in tooling costs.

This year, Ford will spend \$610 million in tooling and facilities, and completion of currently planned programs will require approximately \$460 million, the company reports.

New Tire Test Proving Ground To Be Constructed by Goodyear

A multi-million dollar tire test proving ground is to be built by The Goodyear Tire & Rubber Co. at San Angelo, Texas.

The facility, according to Goodyear president E. J. Thomas, will be the largest of its kind in the rubber industry. It will include a banked five-mile high-speed circle, a meandering 20-mile paved figure-eight turnpike road, a 2 $\frac{1}{2}$ -mile tractor tire straightaway, a 5-mile wandering gravel road and headquarter buildings. The circle will accommodate speeds to 160 mph. Goodyear will continue to maintain tire testing facilities in Akron, O., which are being expanded.



NEW TITANIUM PROCESS

Bench machinist at Los Angeles Div. of North American Aviation, Inc., demonstrates North American's new way of preparing titanium edges for stretch-forming. Sheet of titanium on right is pulled through cutters on special machine to assure smooth, even edges. Process overcomes titanium's tendency to crack whenever there are rough edges of shear fractures, and has reduced mortality rate on stretch jobs from 75 per cent to one per cent. Savings in tools and manhours are reported to be quite appreciable.

Firestone Heat Treating Nylon For Use in Tire Manufacturing

Firestone Tire & Rubber Co. has installed a new nylon heat treating unit at its Akron head plant for tensioning and gum-dipping nylon cord used in tire manufacturing.

The unit, which stands 90 ft tall, contains 20 fans, 16 heaters and 14 drive motors, and applies tension of 30,000 lb to the cord. As cord travels through the machine it is impregnated with a liquid rubber and chemical solution, then stretched and tempered in the water-cooled tension rolls and 450 F gas-fired ovens.

Glamour Truck Sales Exceed Expectations

The current trend towards advanced styling for trucks is beginning to pay off. Dodge Truck Div. now predicts it will build 5000 Swept-side 100 half-ton trucks during 1958. So far this year, sales have topped 2000 units since introduction in June. Production is running as high as 75 units a day. The Sweptside, with power assists, has the standard Dodge station wagon quarter panels, with fins.

Another glamour truck, the Ford Ranchero, has caught on faster than Ford had anticipated. The company earlier this summer doubled its rate of production on Ranchero.

TABLOID

A simple, inexpensive method of producing purer high-melting-point metals has been developed at Illinois Institute of Technology. The new process produces titanium, zirconium, chromium, hafnium, niobium, and vanadium directly from their oxides.

Firestone Tire & Rubber Co. reports that it has installed the largest nylon heat treating unit in the world at its headquarters plant in Akron, O.

General Motors research staff has developed a vapor pressure "bomb" that duplicates gasoline vapor pressure conditions and thus can be used to test vapor lock tendencies in gasoline.

General Electric Co. has received an \$8.9 million order from Convair Div. of General Dynamics Corp. for jet engine thrust reversers for the Convair 880 jetliner. . . . Beckman Instruments is building an electronic data handling system for North American Aviation, Inc. that will speed wind tunnel testing of supersonic aircraft.

Dow Chemical Co. has established a new magnesium sales section devoted exclusively to marketing big magnesium and aluminum extrusions from its new 13,200-ton press.

Lockheed Aircraft Corp. reports that it rolled out a new kind of jet plane—a 10-passenger utility transport named the JetStar—after a record development time of only 30 weeks.

Caterpillar Tractor Co. has begun construction of a new 500,000 sq ft industrial engine plant near Peoria, Ill. . . . Link-Belt Co. is building a new \$5 million bearing plant in Indianapolis, which will increase by 50 per cent the capacity of the present Dodge bearing plant.

General Electric Co. has moved the West Coast headquarters of its chemical materials department to 1211 North Olive St., Anaheim, Calif.

General Motors Corp. has opened a new \$5.6 million assembly plant in Switzerland that will have an annual output of 16,000 cars.

Stolper Steel Products Corp. has purchased Allen Industrial Products of Battle Creek, Mich.

Parker Rust Proof Co. has opened a new plant in the Lindbergh-Warson industrial center of St. Louis County.

Radioplane Co. has been merged into Northrop Aircraft, Inc., and will be operated as a line division. . . . Electric Storage Battery Co. directors have approved a plan to merge with Ray-O-Vac Co.

Reynolds Metal Co. is expanding its automotive sales and service organization in Detroit to meet the demand for more aluminum in new car design.

Rohr Aircraft Corp. has received an initial contract amounting to \$14 million for the manufacture of fuselage sections for the Boeing 707 jet Stratoliner. . . . Flight Refueling, Inc. has been awarded a contract by Martin Co. for the design and manufacture of prototype probe and drogue aerial refueling equipment for the P6M Martin SeaMaster.

Kolcast Industries, Inc., is now producing super alloy ingots for Firth Sterling, Inc., as a result of an agreement made early this year.

Bell Aircraft Corp. has purchased the Birma Mfg. Co., Inc., and will operate the company as a wholly owned subsidiary.

Harrison Radiator Div. of General Motors Corp. is now producing gas turbine regenerators, and has completed its first one—a 56-ton, two section unit.

Rocket Fuels Div. of Phillips Petroleum Co. has developed a new type of rocket motor whose firing duration is in excess of eight minutes.

(Turn to page 146, please)



Army's new rough-terrain fork-lift truck is amphibious

Big Three Presidents Reject UAW Bid for \$100 Price Cut

The presidents of Chrysler Corp., Ford Motor Co., and General Motors last month said "no" to a United Auto Workers proposal that the car makers cut 1958 prices an average of \$100 per car as a check against inflation. UAW president Walter Reuther made the proposal in a letter to the three company presidents, in which he stated that the union, in turn, would shape its demands accordingly during contract negotiations next spring.

GM president Harlow H. Curtice, in reply, suggested that the UAW agree to a two-year extension of its current GM contract, due to expire next May.

Ernest Breech, Ford board chairman, said during a press conference at the Edsel preview that "no doubt there will be some price increases" in the coming year.

Lincoln, Mercury Divs. Joined To Strengthen Market Position

Ford Motor Co. has combined its Lincoln and Mercury divisions into a separate division to strengthen the company's market position above the low price field. James J. Nance, formerly vice president-marketing at

Ford, is vice-president and general manager of the new division.

Lincoln and Mercury formerly were a single division, but in April, 1955 they were split off as autonomous units. One of the major reasons for the reunion was to bolster the two dealer organizations. Since all Lincoln manufacturing is centered in a single factory at Novi, Mich., the move is not expected to have any direct effect on manufacturing.

Ben D. Mills, formerly general manager of Lincoln, continues as a vice president and is now assistant general manager of the Lincoln and Mercury Div. F. C. Reith, who was Mercury general manager, will receive another executive position, according to the company.

North American Gets Award For Air-to-Surface Missile

The Air Force has awarded North American Aviation Corp. a contract to develop, on a high-priority basis, an air-to-surface missile for long-range bombers.

The contract for development of the new missile was given to North American, the Air Force said, after six weeks of extensive evaluation of proposals submitted by 12 different competing groups.

QM Corps Demonstrates Amphibious Fork Truck

A fork-lift truck that "swims," climbs sand dunes, pulls itself out of holes, drives sideways, reaches for its load and then holds the load on an even keel over any terrain has been unveiled by the U. S. Army Quartermaster Corps.

Officially designated a "rough terrain fork truck," the machine is designed to move military supplies from landing craft to inland storage points under combat conditions. It traverses sand dunes, snow fields, and virtually all types of difficult terrain inaccessible to conventional handling equipment.

Designed to Army specifications by the Industrial Truck Div. of Clark Equipment Co., the new truck can readily move through surf and five feet of water. An oscillating rear axle keeps it level when passing over bumps or depressions. Both two-wheel and four-wheel drive take it through sand and up hills. It will travel 25 mph in both forward and reverse.

Two models, one of three-ton and the other of five-ton capacity (see illustration) were demonstrated recently to military observers at Fort Story, Va.

Ford Adding 186 Dealers For British-Built Small Car

Ford Motor Co. has added 186 new dealers to the 350 already signed to sell Ford's British-built cars. Henry Ford II in a press conference Aug. 28, said the company expects to sell 15,000 units this year. With added dealers and more interest in the small cars, Ford should top this figure in 1958.

Mr. Ford pointed out, however, that there are no plans for importing German-built Fords, since the West European market is absorbing full production of those cars.

On the other hand, Ernest Breech, Ford board chairman, told the press conference that so far there is not sufficient volume in small cars to justify tooling for production in this country. He added, however, that Ford is watching the situation. He pointed to the success of the larger Ford Fairlane 500 this year as indication that the so-called small car trend is not important at this time.

Mr. Ford also took the occasion to revise his earlier prediction of 5.8 million passenger cars this year, stating that the final figure probably will be around six million. His remarks were made at a press conference during a preview of the Edsel.



NEW TU-110 IS RUSSIA'S FOUR-JET VERSION OF TWIN-ENGINE TU-104

Russia's Tu-110 is a four-jet development of its twin-engined Tu-104. It has a longer forward fuselage with additional passenger accommo-

modation. Alternative layouts provide 78 or 100 seats. Plane is claimed to cruise at nearly 500 mph, with a range of 2,145 miles.

New Metals Concern Formed; Assets Exceed \$55 Million

The formation of the largest integrated company in the special metals industry, with assets exceeding \$55 million, was jointly announced by the presidents of three companies currently engaged in the production of titanium, zirconium and other light metals.

The three companies are P. R. Mallory & Co., Inc., Sharon Steel Corp., and National Distillers & Chemical Corp.

Mallory-Sharon Titanium Corp. (now jointly owned by P. R. Mallory and Sharon Steel) plans to acquire all of the titanium and zirconium production facilities of National Distillers, plus the entire ownership of Reactive Metals, Inc., now jointly owned by National and Mallory-Sharon. Following this transfer of National's metal facilities, Mallory-Sharon will change its name to Mallory-Sharon Metals Corp. This corporation will then be owned, one-third each, by National Distillers, P. R. Mallory and Sharon Steel.

According to the joint statement by Joseph E. Cain, president of P. R. Mallory, Henry A. Roemer, chairman and president of Sharon Steel, and John E. Bierwirth, president of National Distillers, each of the three participating companies will have equal representation on the board of Mallory-Sharon. James A. Roemer will continue as president.

An exclusive, royalty-free license in the U. S. to a new sodium reduction process developed by National for the production of titanium, zirconium and other metals will be granted to Mallory-Sharon, according to Dr. Robert E. Hulse, National's executive vice-president in charge of

chemical operations. "This process," he said, "is believed to be the lowest cost method developed to date for the production of metal sponges."

Studebaker-Packard Cuts Loss For First Half by 80 Per Cent

Studebaker-Packard cut its loss during first half of 1957 by more than 80 per cent, reporting a deficit of only \$6,810,202 for the period ended June 30 compared with a net loss of \$35,465,456 last year. Sales dropped to \$105,086,040 from last year's total of \$181,612,336. For the second quarter, losses totaled \$4,311,845 compared with \$21,159,283 a year ago, and sales were \$47,264,681 compared with \$74,816,898 in 1956.

The company said that June and July car sales were highest of the year, and no inventory problem is anticipated when '58 models are introduced. Part of the loss was attributed to preparation for 1958, including setting up Mercedes-Benz dealers.

Industry Group Formed To Study Nuclear Center

Four major U. S. companies have established a Nuclear Test Center Study Group composed of scientists and economists to study the possibility of building and operating a nuclear testing center with private capital.

The four cooperating companies are ACF Industries, Inc., Kaiser Engineers, Lockheed Aircraft Corp., and Phillips Petroleum Co.

The concept of such a center is in conformance with the desire of the Atomic Energy Commission and the Joint Committee on Atomic Energy to hasten the time when nuclear testing

facilities will be built and operated with private capital rather than with government funds, spokesmen for the companies said. They added that services of the test center would be available to government agencies, educational institutions and both domestic and foreign industrial enterprises.

Among the many facilities that would be included in such a center are a very-high neutron-flux test reactor—used primarily for nuclear test component irradiations and for production of high-specific-activity radioisotopes—and supporting laboratories to complement the test reactor.

General Tire Chemists Develop New Urethane Synthetic Rubber

A new synthetic rubber, described as capable of outwearing any known rubber, has been developed by the General Tire & Rubber Co.

The new product, a polyurethane rubber called Genthane "S," is reported to be completely resistant to oil and ozone and capable of indefinite storage without deterioration.

Immediate uses for Genthane, according to William O'Neil, General Tire president, will be in valves, gaskets, oil hose, O-rings, oil seals, pumps, wire and cable insulating covers, and vibration absorbers in the automotive, military, communication, and appliance fields.

Mr. O'Neil said that the company expected the new product to make "major inroads into an estimated 200 million lb annual market, with the field broadening considerably as more extensive and diverse usage is developed."

Continued on Page 118

MEET IN THE NEWS



Timken Roller Bearing Co. — Dwight A. Bessner was elected executive vice-president.

Borg-Warner Corp.—**Andrew W. Rose** has been named vice-president and assistant to the president of **Byron Jackson Div.**, and **Roy Norton** was appointed assistant director of engineering of **Long Mfg. Div.**

Goodyear Tire & Rubber Co.—**Walter L. Jones** has been appointed manager of the industrial tire sales department.

Vickers Inc.—**R. E. Esch** was elected a vice-president of the company.

Studebaker-Packard Corp.—**F. L. Armstrong** is now in charge of domestic sales of Mercedes-Benz cars, and **W. J. Swarm** has been appointed administrative assistant to the manager of Mercedes-Benz operations.

Ford Motor Co.—**John Najjar** was named executive stylist, **Advanced Body Studio, Advanced Styling; Arnett B. Grisinger**, executive stylist, **Mercury Exterior Studio; Irving B. Kaufman**, executive stylist, **Mercury Interior Studio; and Robert H. Weiland**, executive stylist, **Lincoln Interior Studio.**

Surface Combustion Corp.—**E. P. Heiles, C. Cone, and J. I. Trimble** were elected vice-presidents.

Chrysler Corp.—**Claude T. McClure** was appointed director of service of **Chrysler Div.**, and **Wendell S. Clough** was named manager of product and volume planning for the **Export Div.**



Volkswagen of America, Inc.—Scott Stewart has been named manager of public relations.



Chevrolet Motor Div., General Motors Corp.—Joseph A. O'Kroy is now manager of the Tarrytown, N. Y., assembly plant, and Sylvester J. Thrasher has become divisional manager of quality control.

Chevrolet Motor Div., General Motors Corp.—**Leo M. Seidl** has become manager of the **Saginaw, Mich., transmission plant.**

Reynolds Metals Co.—**W. G. Reynolds** was named president of **Reynolds International, Inc.**

AC Spark Plug Div., General Motors Corp.—**Martin J. Caserio** was appointed manager of **Milwaukee operations; Glen R. Fitzgerald**, director of engineering and equipment sales for **Flint plants; and Leo W. Tobin, Jr.**, chief automotive engineer.

Sharon Steel Corp., Brainard Steel Div.—**Harold A. Tucker** has become manager of marketing research.

Babcock & Wilcox Co., Tubular Products Div.—**James J. Barrett** has been appointed manager of extrusion sales.

Clark Equipment Co.—**Robert F. Henderson** was named director of market research.

Dow Chemical Co.—**Donald Williams** was appointed director of corporate relations.

General Electric Co.—**Jerome T. Coe** has been appointed manager of marketing for the **Silicone Products Dept.**, succeeding **T. C. Ohart** who has become general manager of the **Insulating Materials Section.**

Borg-Warner International Corp.—**Robert A. Brown** has been appointed vice-president, general sales manager.

R-N Corp.—**Alex Stewart** has been elected president and general manager.

Buick Motor Div., General Motors Corp.—Donald F. Taylor was named general manufacturing manager.



Dana Corp.—**R. R. Furney** has become assistant chief engineer, **Clutch Div.; M. M. Schall**, assistant chief engineer, **Hydraulic Transmission Div.; and R. E. Fletcher**, assistant chief engineer in charge of production engineering activities, and **Carl Gustafson**, assistant chief engineer of advanced engineering activities, **Mechanical Transmission Div.**

Oakite Products, Inc.—**Edward L. Carlson** is now director of all information services.

General Motors Corp.—**Donald L. Boyes** was appointed general manager of **Delco-Remy Div.; Warren E. Milner**, general manager of **Hyatt Bearings Div.; and Albert F. Davis**, general manager of **Diesel Equipment Div.**

Mercury Div., Ford Motor Co.—**Page D. Warren** has become central regional sales manager in charge of Mercury sales in the **Detroit, Cleveland, Cincinnati, Pittsburgh, and Buffalo sales districts.**

Union Carbide Corp., Silicones Div.—**R. S. Abrams** has been appointed general manager; **L. J. Sinnott**, general sales manager; **H. M. Johnson, Jr.**, product manager-rubber, and **J. H. Lorenz**, assistant manager.

Aeroquip Corp., Industrial Div.—**M. Lloyd Jones** has been named manager, distributors' sales, and **Victor Emery** has become manager, manufacturers sales.

Hercules Motors Corp.—William L. Pringle has been elected president, succeeding John C. Keplinger, who continues as director and executive consultant.





Perfect Circle Corp.—G. R. Baer has been named general manufacturing manager.

Westinghouse Electric Corp., Electronic Tube Div.—W. B. Sauter has been named general manager.

Bendix Aviation Corp., Montrose Div.—Malcolm G. Douglas is now director of sales and service.

Baker-Raulang Co. — Harry P. Wiseman has become publicity manager.

Convair Div., General Dynamics Corp.—R. R. Hoover was named assistant chief engineer-administration, and Richard P. White succeeds him as chief design engineer.

ACF Industries, Inc., Carter Carburetor Div. Frank A. Barnes was named director of quality control.

Pangborn Corp.—James R. McConnell has been appointed manager, abrasive sales.

Westinghouse Electric Corp. — John B. Graef is now manager of aviation industry sales.

Lord Mfg. Co., Special Products Div.—Joseph W. Gallagher was appointed manager of marketing.

Leece-Neville Co.—John R. Poyser, Jr., has become works manager.

Northrop Aircraft, Inc., Northrop Div.—Alan C. Morgan has been elected vice-president of contracts.

Hercules Motor Corp.—Henry H. Timken, Jr., was elected chairman of the board, and Walter F. Rockwell was elected a member.

Goodyear Tire & Rubber Co., Aviation Products Div.—George Bachtel has been named administrative assistant to the general manager, and Edward Wolf has become manager of the special products department.



Zollner Corp. — Gene Corman is now executive engineer.

Mechanical Handling Systems, Inc.—Joseph F. O'Hara, Jr. has been appointed general sales manager.



Fageol Products Co.—S. C. Stratton was named vice-president in charge of manufacturing.

Lear, Inc., LearCal Div.—Edward F. Conklin has been appointed division general manager.

Bendix-Westinghouse Automotive Air Brake Co., Air Brake Div. — Stephen Johnson, Jr., has been appointed general manager; R. Van Dyke Firth, director of engineering; and Harry M. Valentine, chief engineer.

Ford Motor Co. — Don R. DeLaRossa has been appointed chief stylist in the Lincoln Styling Studio.



Cornell Aeronautical Laboratory, Inc.—Maurice M. Kaushagen has been appointed head of a new Electronics Dept.; Walter P. Targoff, head of the Aero-Mechanics Dept.; King D. Bird, head of the Transonic Wind Tunnel Dept.; Robert A. Wolf, head of a new Systems Requirements Dept.; and David A. Kahn, head of a new Systems Synthesis Dept.

Lindberg Engineering Co.—K. A. Lang is now general manager of the Downey, Calif., manufacturing plant.

Chrysler Corp., Export Div.—Charles S. Dennison has been named general sales manager.

Hooker Electrochemical Co.—James S. Sconce is now technical assistant to management.

National Lead Co.—Charles L. Schmidt has been appointed technical director of the Titanium Div., and George W. Wunder has been named manager of the new Nuclear Metals Div.

General Logistics — Dick Mosher has been appointed industrial sales manager.

B. F. Goodrich Co., Sponge Products Div. — William R. Todd has been named president.



Goodyear Tire & Rubber Co.—George L. Fetherolf was named to direct automotive crash pad sales for the Engineered Products Dept.

Sahlin Engineering Co.—John J. Feeley has been elected to the board.

Columbus Bolt & Forging Co.—Robert D. Bair is now manager of industrial engineering.

(Turn to page 168, please)

Necrology

Irving Langmuir, 76, Nobel Prize winner and a member of the staff of General Electric Research Laboratory, died Aug. 16, at Falmouth, Mass.

H. Jay Hayes, 88, builder of the first all-metal automobile body, died Aug. 15, at Forest Hills, N. Y.

Giovanni Farina, 72, a pioneer automobile body designer, died Aug. 18, at Turin, Italy.

David C. Maxwell, 52, general superintendent of manufacturing at the Chevrolet plant in Buffalo, died Aug. 18, at Buffalo, N. Y.

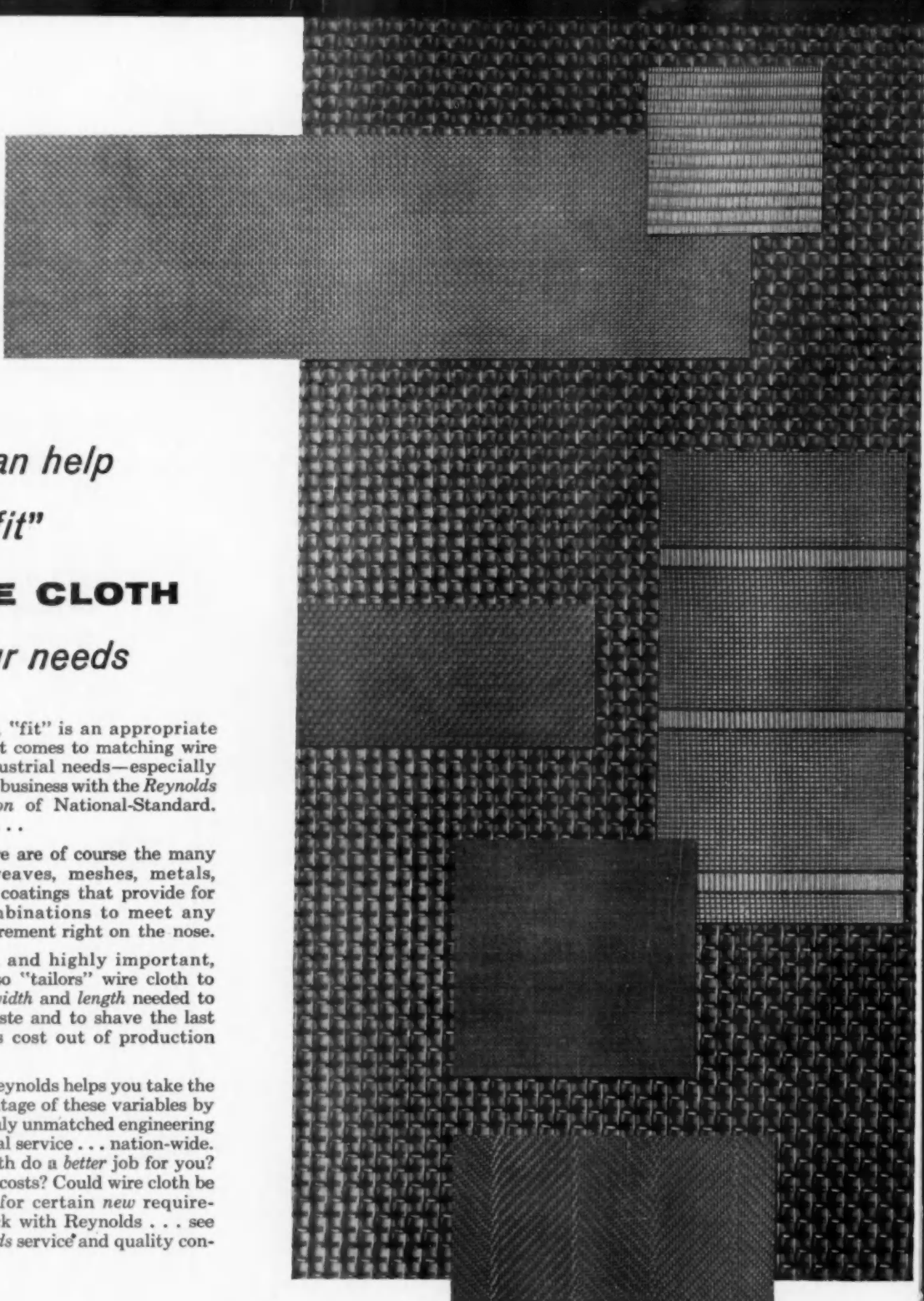
Isaac Harter, 77, former vice-president of the Babcock & Wilcox Co., died Aug. 22, at New York City.

H. B. Spackman, 58, president of Lyon Metal Products, Inc., died Aug. 20, at New York City.

Harold H. Johnson, 56, director of research for National Malleable & Steel Castings Co., died Aug. 22, at Cleveland, O.

Harold L. Pettingell, 69, a retired vice-president of Lee Tire & Rubber Co., died Sept. 3, at Brooklyn, N. Y.

William J. Magee, 68, retired treasurer and director of Norton Co., died Aug. 26.



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WAGNER LITHO MACHINERY, Secaucus, N. J.; meter decorating equipment • ATHENA STEEL, Clifton, N. J.; flat, high carbon spring steels • REYNOLDS WIRE, Dixon, Ill.; industrial wire cloth

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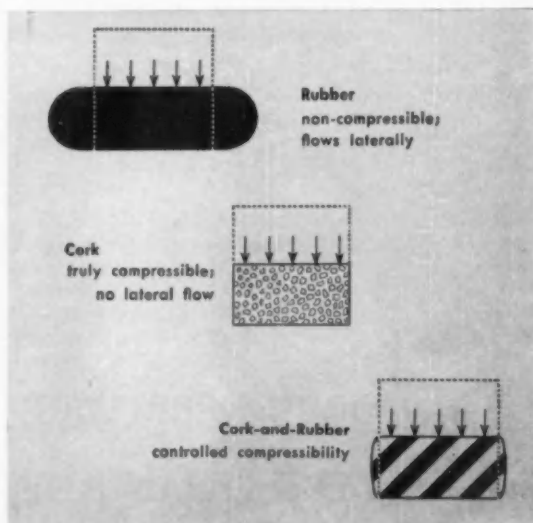
How to cut the cost of O-rings

Lathe-cut, compressible cork-and-rubber rings often can reduce your O-ring costs substantially. At the same time, they may effect savings in machining time and inventory costs. Here's why:

Molded rubber O-rings are incompressible and therefore must be made to very close tolerances to allow perfect fit between the flanges. An O-ring too small in cross-section will not seal effectively . . . and an oversize O-ring will prevent flange contact.

Cork-and-rubber compositions, on the other hand, combine the compressibility of cork with the non-compressibility of straight rubber compounds. This compressibility can be controlled and compositions produced which are nearly as compressible as cork, or almost as incompressible as rubber. The percent of compression for cork-and-rubber rings may range, therefore, from 20% to 33%.

In some applications, the wider tolerances permissible with compressible lathe-cut rings may effect savings in machining time. In other cases, it may be possible to reduce inventories because one size of



cork-and-rubber ring may work where two or more rubber O-ring sizes might otherwise be required.

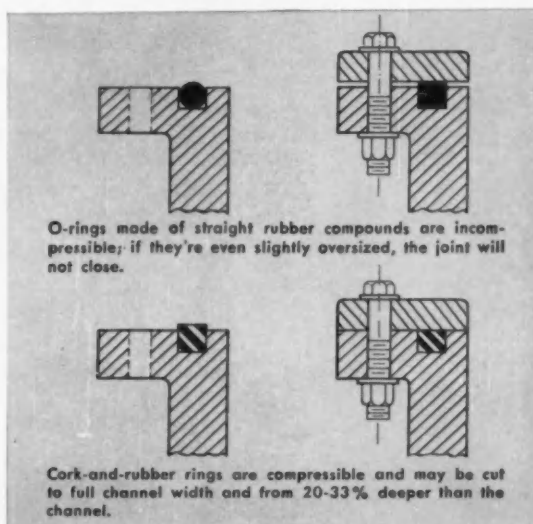
Armstrong Cork-and-Rubber Rings can be cut to fit existing channel dimensions (from $\frac{3}{8}$ " to 20" I.D.), with no change required in channel size or design.

Imperviousness

All lathe-cut Armstrong cork-and-rubber compositions are impervious. Their rubber binder encloses each cork particle in a continuous matrix. Cork-and-rubber can be used to seal high internal pressures. The upper and lower temperature limits vary with the different compositions and with the fluids to which they are exposed. In most cases, continuous operating temperatures should not exceed 300° F.

Solvent resistance

The solvent resistance of cork-and-rubber compositions is comparable to straight synthetic rubbers of corresponding base polymers. For example, cork-and-chloroprene-type synthetic rubber is normally used with lubricating oils, and for general purpose applications where some swell is desired or can be



tolerated. Cork-and-nitrile-type synthetic rubber provides good gasoline and aromatic-solvent resistance and has less tendency to swell or stick on metal surfaces. Cork-and-styrene-type synthetic rubber compounds, however, have very limited solvent resistance and should not be used for these purposes.

SEND FOR 24-PAGE GASKET MANUAL

You'll find other useful information on the design and use of gaskets in the new Armstrong Gasket Design Manual. Write for your copy to Armstrong Cork Company, Industrial Div., 7109 Imperial Ave., Lancaster, Pa. For information on all Armstrong Gasket Materials, see Sweet's product design file.

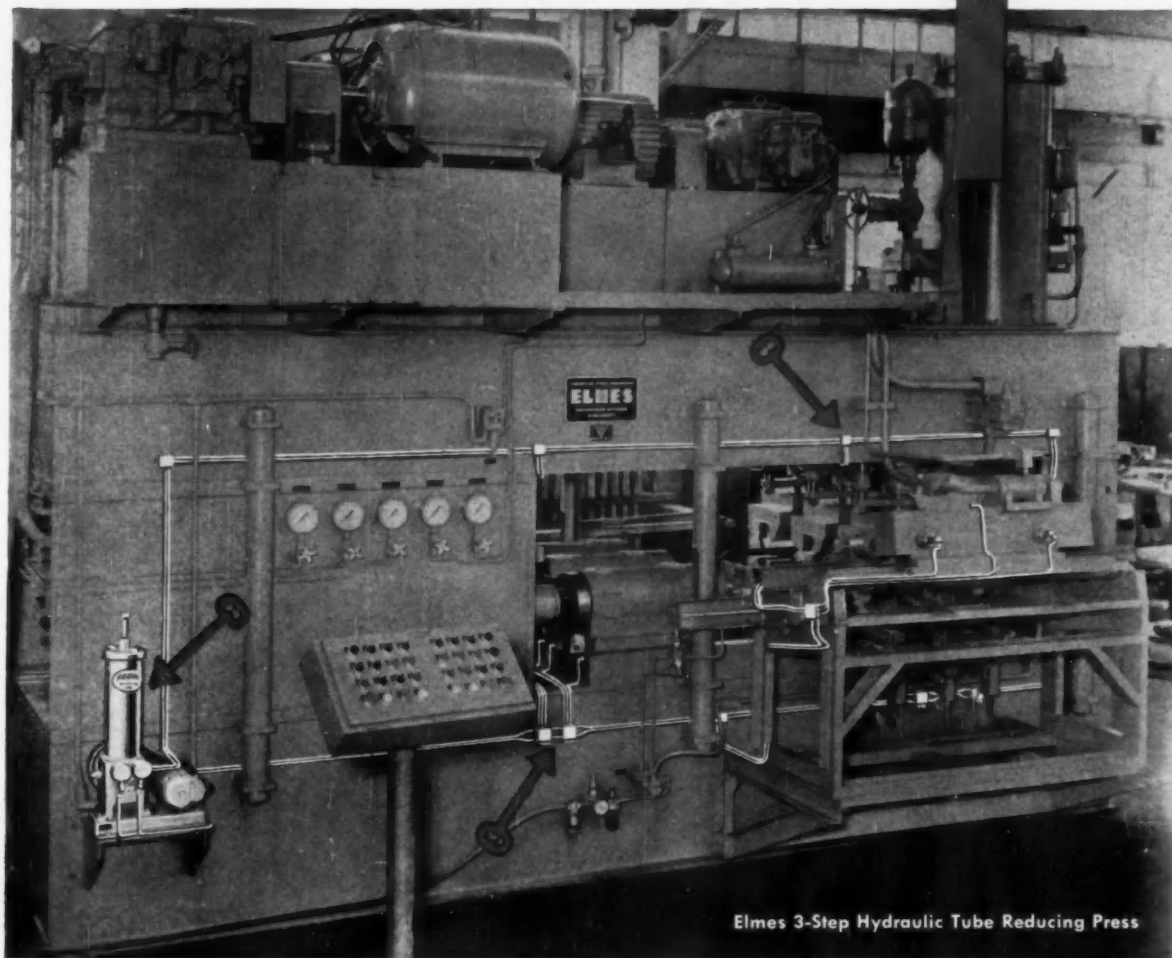


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GASKET MATERIALS
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Elmes 3-Step Hydraulic Tube Reducing Press

● With automation, centralized lubrication is a must. What automated line can afford to slow down or shut down because a forgotten bearing has run dry?

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Farval delivers a measured amount of clean oil or grease to every bearing served, at any desired, predetermined interval. No bearing is ever missed—and the amount of lubricant delivered to any one bearing can be varied without affecting the rest of the system. Guesswork and hit-and-miss hand oiling are eliminated with Farval.

A Farval Centralized Lubrication System, manual or automatic, is easily designed into any machine. Let us send a representative to discuss application of Farval to your equipment. Drop us a line. Also ask for Bulletin 26-S. The Farval Corporation, 3296 East 80th Street, Cleveland 4, Ohio.

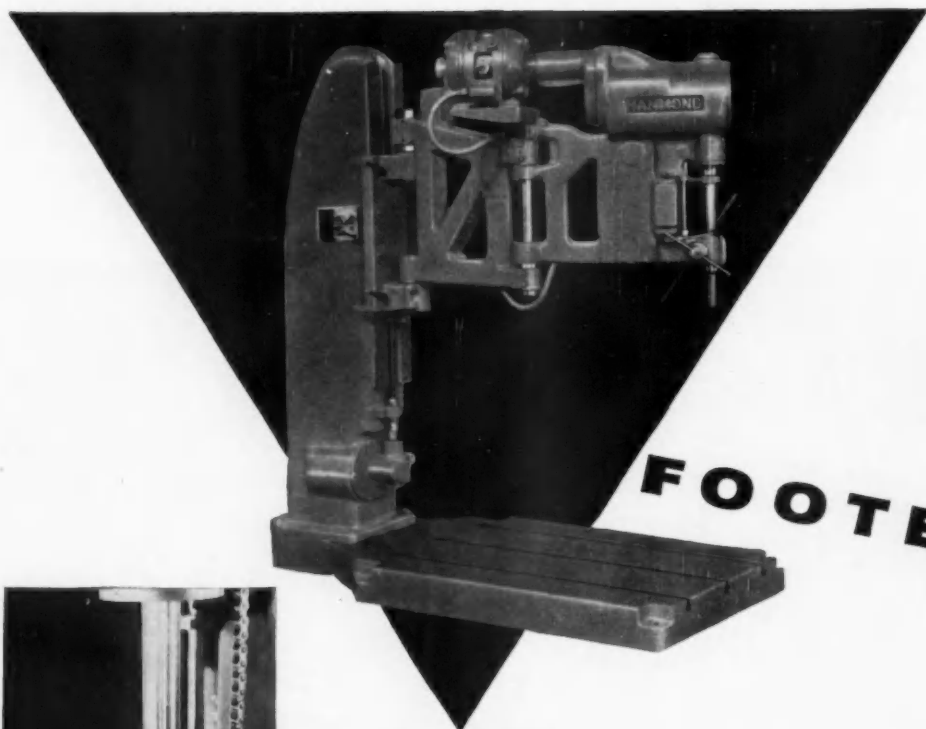
*Affiliate of The Cleveland Worm and Gear Company, Industrial Worm Gearing,
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Wherever you see the sign of Farval—the familiar central pumping station, dual lubricant lines and valve manifolds—you know a machine is being properly lubricated.

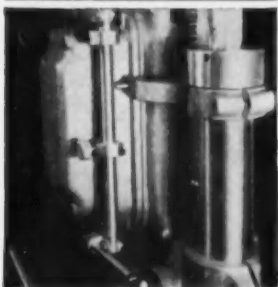
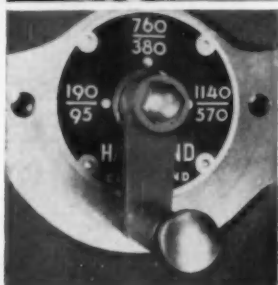
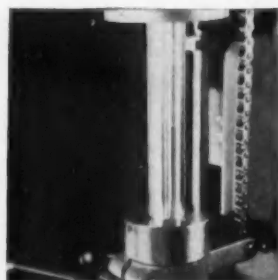
This Farvalized machine is an Elmes 60-ton Tube Reducer. In three steps it reduces tubing for drive shafts for a well-known Michigan-made automobile.





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Hammond Radial Drilling and Tapping Machines may be spotted in the production line for drilling, tapping or reaming. With its unique Bracket Type construction the spindle can be swung quickly from hole to hole. Six Quick Speed Changes are instantly available and the Hammond Tapping Reverse is very fast and convenient to operate.

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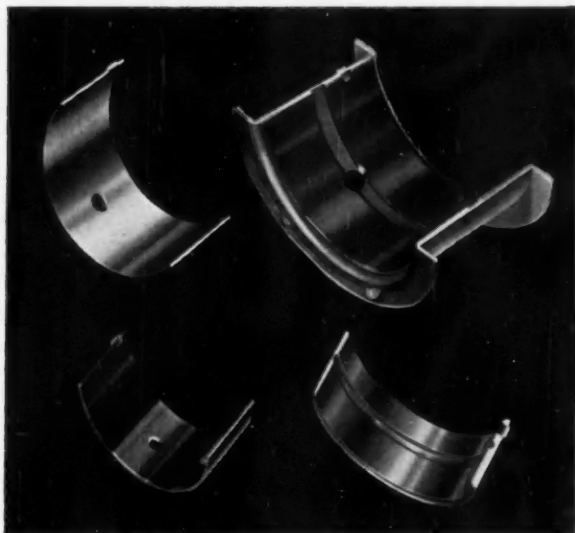
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Experience shows a steel back lined with tin- or lead-base babbitt or copper-alloy meets performance requirements.



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Rolled split plain bronze, steel or aluminum; or steel lined with bronze, babbitt or copper-alloy. Many design variations possible, plus volume production economies.



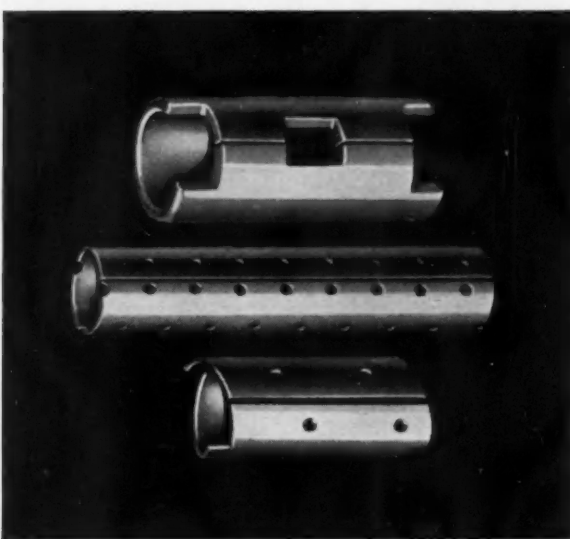
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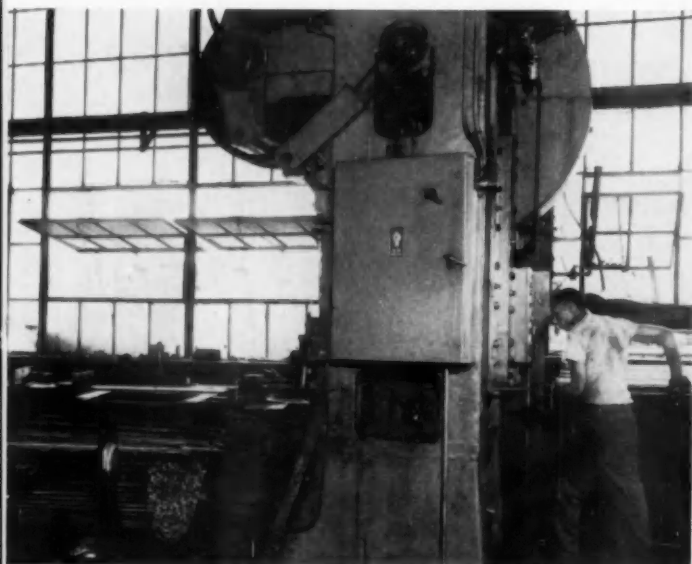
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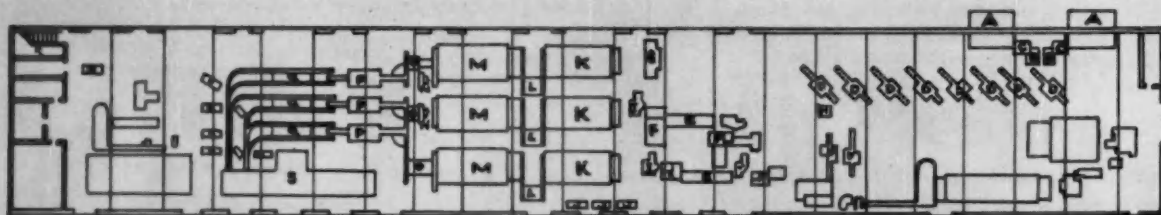


Bars are sheared to forging length in 175-ton Bliss presses



One of the stages of upsetting. The open side heating furnace is in the background; the National upsetter is at the left. The operator is seen loading forged bars onto the conveyor leading to the next forging operation.

Below is a floor plan of the spring shop. A—Loading racks. B—Unloading racks. C—Shear presses. D—Grinders. E—Conveyors. F—Furnaces. G—Electro forge machine. H—Coin press. I—Headers. J—Gas generators. K—Hardening furnaces. L—Oil quench and straightening machine. M—Draw furnaces. N—Straighten and inspection machine. O—Water cooling tank. P—Shot peening machine. Q—Preset machine. R—Magnaflux machine. S—Paint enamel line.



Chrysler's Setup for Making Torsion Bars

By Joseph Geschelin

TORSION bars for the front suspension of Chrysler Corp. cars are produced in a compact layout at the corporation's Detroit Forge Plant on Lynch Road. The present arrangement of operations and equipment is shown in the small floor plan reproduced here.

Except for certain special sizes the regular production run comprises six different diameters in two different lengths and hex sizes, and in rights and lefts for each size. The regular production run includes 14 different bars each suitably identified by a color code. The standard production bars are described in the following table:

| Small Hex | | 44.5 inches length | |
|-----------------------|-------------------------|-----------------------|--|
| | | Preset Specifications | |
| Bar Diameter (In.) | Wind-up Angle (Min.) | Preset Angle | |
| 1.000 | 100 deg | 38 deg | |
| 1.040 | | | |
| 1.090 | | | |
| Large Hex | | 48.5 inches length | |
| 1.020 | 100 deg | 38 deg | |
| 1.040 | | | |
| 1.110 | | | |
| 1.130 | 96 deg | 36 deg | |

OPERATIONS

The sequence of operations may be described simply in the following outline. Bars of hot rolled spring steel are received from the mill either in the rough or centerless ground condition, in multiples of the required lengths. Approximately 50 per cent of the stock used is centerless ground as purchased from mills; due to mill capacity limitations on grinding, 50 per cent is ground at the plant.

Shearing

The centerless ground bars are delivered by magazine directly to a group of two 175-ton presses for shearing to length. The cold shearing operation required considerable study initially due to the difficulty of shearing spring steel stock cleanly. This problem was solved by shearing the bars with closely fitting lead dies and shear blades that completely enclose the diameter of the bar.

Heading

At the present time the hexagon ends of the bars are produced in 1½ in. headers in two distinct operations. The bars are loaded in a magazine which feeds an open side high-speed gas-heating furnace for heating one end. They are delivered from the furnace to the header on a conveyor and after heading one end, the bar is placed on another conveyor to the second station where heating and upsetting is repeated in another furnace and header.

Hardening

Bars then proceed on conveyors leading to the battery of three hardening furnaces. Here the bars are heated and as they emerge from the furnace they are unloaded onto a conveyor leading directly into oil roll-quenching machines. For this operation, the bars are automatically received in special roll straightening dies in which they are rotated during the quenching cycle. The machine fixture is arranged to handle eight bars at a time.

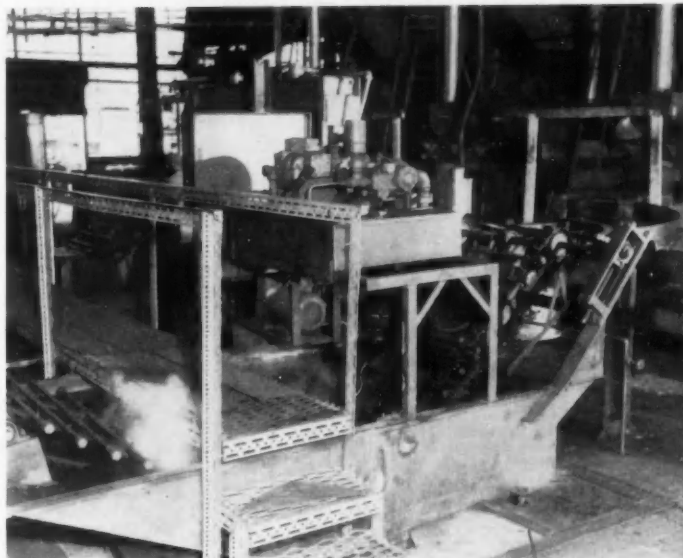
Drawing

From the quenching machines the bars are transported by conveyor into draw furnaces, then into water tanks for cooling. From the water tanks the bars are distributed automatically to individual conveyor lines leading into a group of three horizontal shot peening machines. The latter employ cut steel wire shot and are designed to shotpeen for a minimum coverage of 90 per cent of the bar area.

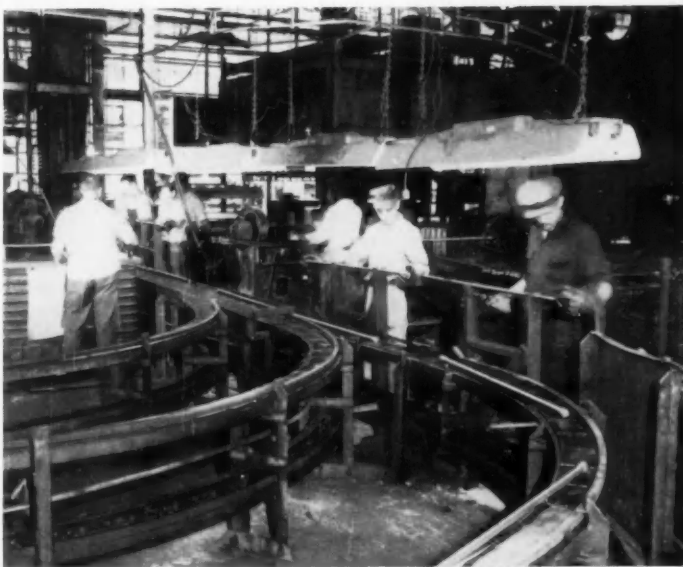
Inspecting

The bars then move automatically on another conveyor to a group of inspection gages where the hex ends of the bar are checked for size. Accepted bars proceed on the conveyor to a group of three presetting machines where each bar is automatically preset to the desired angle indicated in the table above. This operation is quite precise, the amount of preset being held to plus 2 deg or minus 3 deg.

Upon leaving the preset machines the bars drop



Following quenching the bars go to a draw furnace, then are carried through the water tank seen here for cooling. This view also shows some of the automation developed for this line.



Another example of automation applied to material handling. Here the bars have come out of the Gogan presetting machines and are distributed to a group of Magnaflux inspection machines on the curved conveyor lines seen in the foreground.

onto conveyors that transport them to a group of Magnaflux inspection machines. Here each bar is inspected in two operations: one operator loads the bar into the Magnaflux machine for coating and magnetizing; and another operator at the same station inspects the bar visually to assure freedom from surface and sub-surface defects.

(Continued on next page)



Start and finish of torsion bar paint line. Bars are placed on the bar conveyor on one side, as seen here, and removed on the opposite side.

Dipping, Baking

In the final operation the bars are loaded individually onto a bar conveyor which carries the bars through a washing operation to remove dirt, oil, and to provide a chemically passive, paint-receptive surface, then through dip paint tanks, and drying ovens. Bars are given two coats of black enamel in two stages: first they are dipped and baked; then they proceed through another dip and a final bake. They return to the unloading station which, as illustrated, is adjacent to the loading station.

Identifying

The bars then are striped with the proper color identification and loaded on pallets for shipment according to schedule. Each of the pallets contains a load of 280 bars.

Finally, it may be noted that the heading operation is provided with a multiple-station die to effect the following details: upset, trim, and size. A date stamp, steel code, right and left arrow, and part number identification stamp is built into the header ram die.

Motor Vehicles in Japan

By Joseph Geschelin

IF you think that driving is tough in the USA you should drive as we did (or at least sit as a passenger) from Yokohama to Tokyo and around Tokyo. The several arteries connecting Yokohama with Tokyo are a bedlam of traffic and noise and fury since all driving is done by means of horns. Traffic appears to be mainly trucks of all shapes and sizes, an enormous number of taxicabs—Datsun, Austin, Volkswagen, and other makes with the molecular spaces between bumper-to-bumper vehicles filled with an endless procession of motorcycles and bicycles.

Japanese motor vehicle manufacturers are gearing up for increased volume. Most passenger car production has to be earmarked for export since the masses of workers simply cannot afford to buy anything but a bicycle or motorcycle. Such passenger cars as are sold domestically are "commercial," i.e., intended for taxicab service. As of early July when we were touring in Japan, the industry got a lift from the armed forces in the form of substantial new contracts.

We found in Europe the US Army has large stores of vehicles of all kinds assembled on acres of open

space. We were told that the vehicles stored in Yokohama were rebuilt, reconditioned and painted.

Nissan Motor Co., which we visited on a busman's holiday tour, is aiming at a major expansion of facilities together with an improvement in plant layout. This plant, one of the largest producers of trucks and cars in Japan, was completely occupied by the armed forces after the war and its major buildings released only a few years ago. A good part of the property still is in the hands of the US Army but is expected to be released shortly. That will be the starting point for the overhauling and realignment of production facilities.

Nissan has had a license agreement with Austin (England) for producing the Austin Cambridge model. The license is restrictive to the extent that none of the cars are to be exported. And Nissan now is negotiating in an attempt

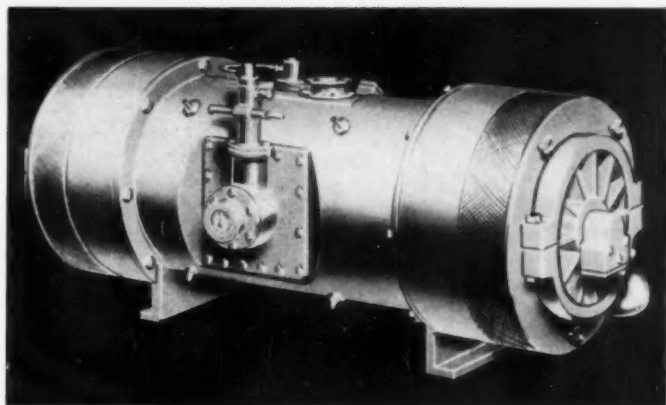
to lift this restriction. Presumably Nissan may stop manufacture of this vehicle at the end of the contract period if it is not permitted to export.

Meanwhile, the company is producing about 600 Austins a month and is reaching for 1000 a month. Profiting by the engineering and manufacturing assistance from Austin, the cars are being produced by modern methods that are quite comparable to up-to-date methods elsewhere, consistent with the scale of production.

Since the export market is the main outlet for any volume of motor cars, we understand that Nissan is planning to design an entirely new car to replace the Datsun. Fresh styling and a larger engine are expected to make these cars more attractive to the export market.

If Nissan may be taken as an example, Japanese motor vehicle plants will require considerable overhauling and modernization in production equipment. The buildings are prewar and doubtless took a beating during the war years due to war production. Here is unquestionably a fertile field for Ameri-

(Turn to page 143, please)



Free piston gasifier, two-stage model FP-165, shown in artist's view. The gasifier hot gas output can power a turbine to produce shaft power, or its output may be used directly for such applications as compressors, pressure-feeding combustion chambers and impulse or hydro-jet propulsion of boats

A NEW free-piston engine design, developed by Baldwin-Lima-Hamilton Corp., is said to be suitable for stationary and mobile power plants, railroad locomotives, marine power plants, farm equipment, large tractor-trailer power plants, construction equipment and other off-the-highway power-driven vehicles.

Power output of the prototype design ranges from 125 shp—available from a single gasifier—up to 1000 shp when gasifiers are used in multiples. The range is avail-

able through the use of two types of free piston engines developed by Hamilton Division of Baldwin-Lima-Hamilton Corp.

Both engines are products of a continuing program of research

The Hamilton Free-Piston Engine

New Power Plant Is a Two-Stage - Compression Unit which Develops 250 Shaft Horsepower with Turbocharging; 125 Horsepower Without Turbocharging

and development that led first to an efficient single-stage design—the Hamilton model DL—then to an advanced two-stage, turbocharged design—the Hamilton FP-165.

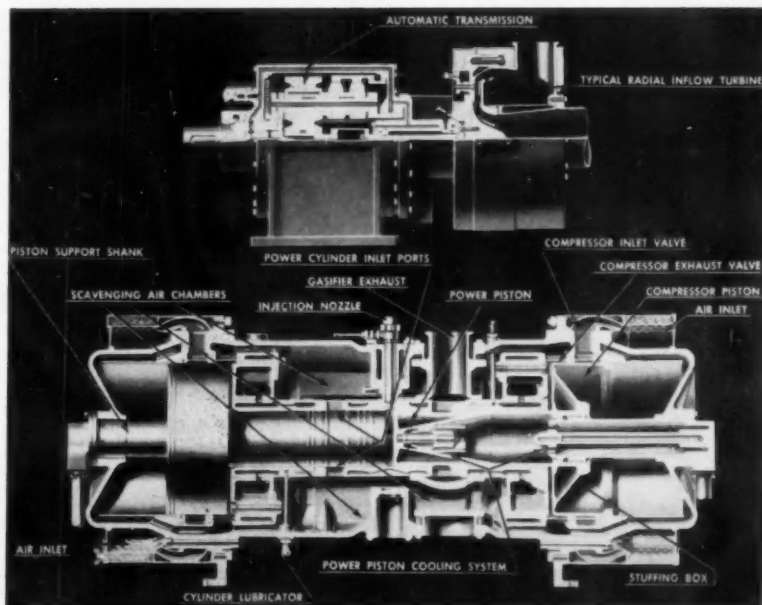
The DL uses a single stage of compression and a patented movable compressor head to produce an output of 500 shp. DL units can be combined in multiples with one turbine to reach a peak of several thousand shaft horsepower, when turbocharged.

The new design FP-165 is a two-stage-compression unit which produces 250 shp with turbocharging; 125 shp without turbocharging.

The model DL unit has been built and tested over the past two years. It can be produced in quantity for a wide range of applications at any time.

The FP-165 has been fully designed. The Hamilton Division states that only production development and engineering are required to ready it for actual manufacture. Advanced performance of the Hamilton FP-165 hinges on its second stage of compression. Other free piston engines, and Hamilton's own previous designs, have been single-stage-compression designs.

Cutaway sectional view of the FP-165 engine



Marvel-Schebler Fuel Injection System

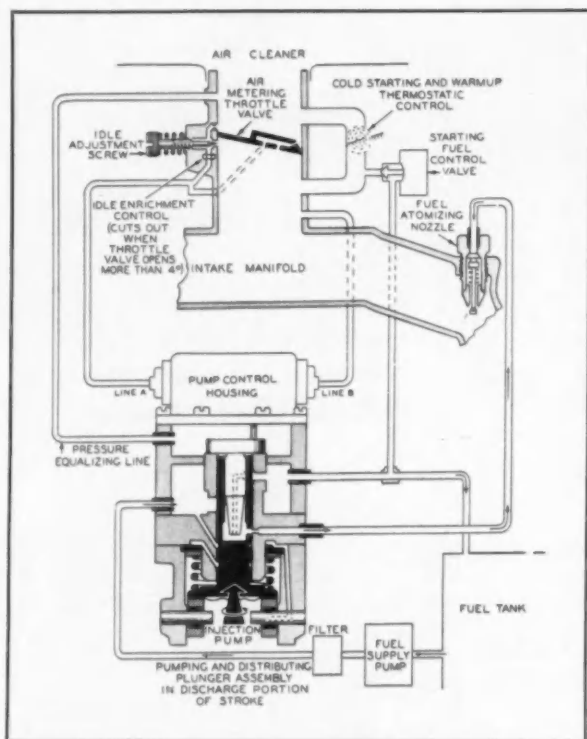


FIG. 1—Schematic diagram of the fuel injection system

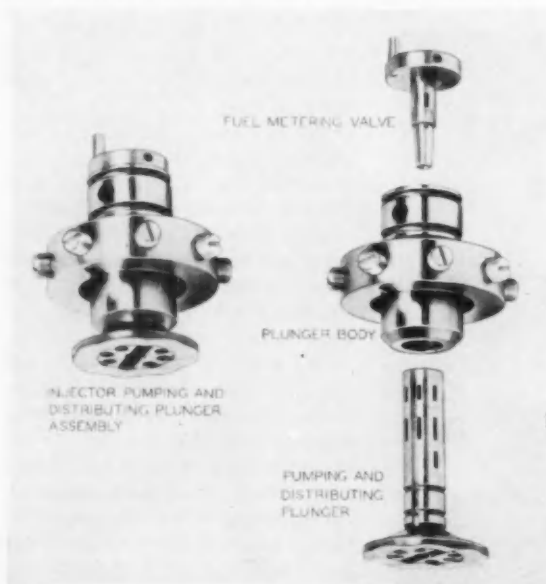


FIG. 2—Pumping and distributing plunger assembly of the injection pump

THE newly-developed Marvel-Schebler injection system for passenger cars, trucks, and tractors consists of five major elements, the injection pump, the air metering throttle, the spray nozzles, the fuel supply pump, and fuel filter, as illustrated diagrammatically in Fig. 1.

The injection pump is the principal element and is the single plunger design that can be modified for 4, 6, or 8 cylinder engines. The pumping and distributing plunger assembly of the injection pump are shown in Fig. 2, along with the three elements that make up an assembly for an 8-cylinder engine. This plunger assembly does the pumping, distributing and metering of gasoline as required by the engine. The three pumping cycles are illustrated in Fig. 3. The plunger is driven at camshaft speed and the plunger reciprocation, or pumping motion, is obtained by rotation of a cam face contacting a roller. For an 8-cylinder engine the cam has 8 lobes. Distribution of the metered quantities of fuel is obtained by plunger rotation with the discharge port in the plunger connecting with a port in the plunger body as the plunger moves up on the cam lobe. On the down stroke of the plunger, inlet ports connecting to the plunger pumping chamber connect with ports in the plunger body leading to the fuel reservoir, and plunger chamber is filled during this down stroke. The amount of fuel discharged during the following pumping stroke depends on the angular position of the fuel metering valve in relation to the plunger. At the closed throttle, or idle fuel cutoff position, a passage in the fuel metering valve connects with ports in plunger and plunger body during the full pumping stroke, and the fuel in the plunger chamber is spilled back to the fuel reservoir rather than through a discharge outlet leading to an atomizing nozzle.

The angular position of the fuel metering valve is controlled by the air throttle which meters the air flowing to the engine cylinders, and by manifold vacuum pressure control. It establishes the proper position of the fuel metering valve so that the pumping and distributing plunger will discharge to each cylin-

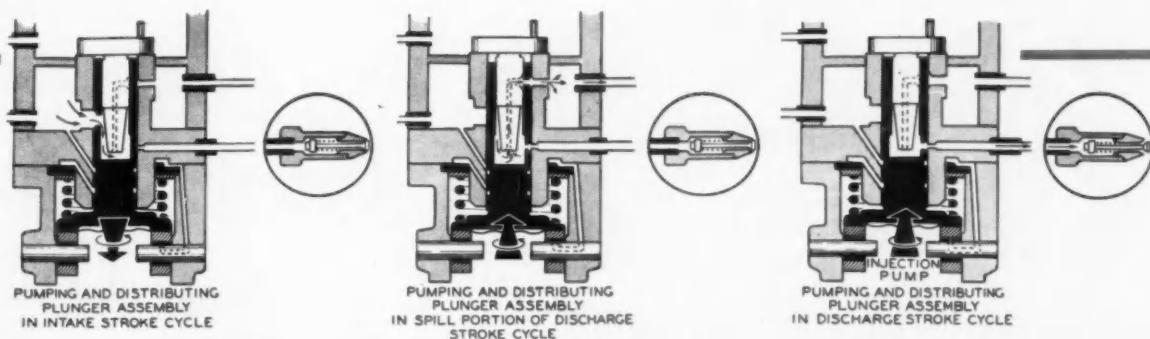


FIG. 3—Injector pumping cycles

der the amount of gasoline needed for the correct fuel-air mixture.

The air throttle is basically a tube, or tubes, with one or more throttle valves, corresponding to single or multiple barrel carbureters, to meter the air requirements of the engine for all speeds and load conditions.

Pump delivery is matched to engine air requirements by manifold pressure. The pump control mechanism is shown in Fig. 4. The fuel valve which controls the injection pump delivery is rotated by movement of a cam, which is actuated by a bellows controlled by manifold pressure. The cam form is developed by calibration checks for the load requirements of the engine.

A moveable track supports the cam, and this track position is altered through bellows and aneroids to provide for speed, temperature, and altitude compensation. Speed compensation control is obtained by mass air flow measurement across the throttle valve.

Fuel enrichment for acceleration is provided for by an arresting device consisting of a sleeve and plunger which acts as a dash pot that temporarily changes the cam track position to cause excess pump delivery over the amount normally delivered by the pump for the corresponding position of the load diaphragm. The cold starting and warm-up thermostatic control provides for a fast engine idle and fuel enrichment during engine warm-up. Additional fuel over the amount delivered by the injection pump for starting is introduced at the butterfly by a solenoid controlled valve, and the amount varies to meet engine requirements for hot or cold starting temperatures.

The atomizing nozzle is the outward opening pintle type, with an opening pressure of 80 psi.

The fuel supply pump must maintain approximately 20 psi pressure in the fuel reservoir and have sufficient capacity to recirculate fuel to the fuel tank at all load conditions. The system provides for deceleration fuel cutoff by movement of the metering valve cam to a full cutoff position.

(Turn to page 138, please)

FIG. 4 — Schematic view of control for matching pump delivery to air flow

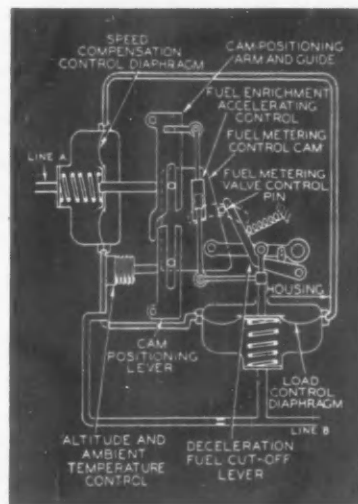
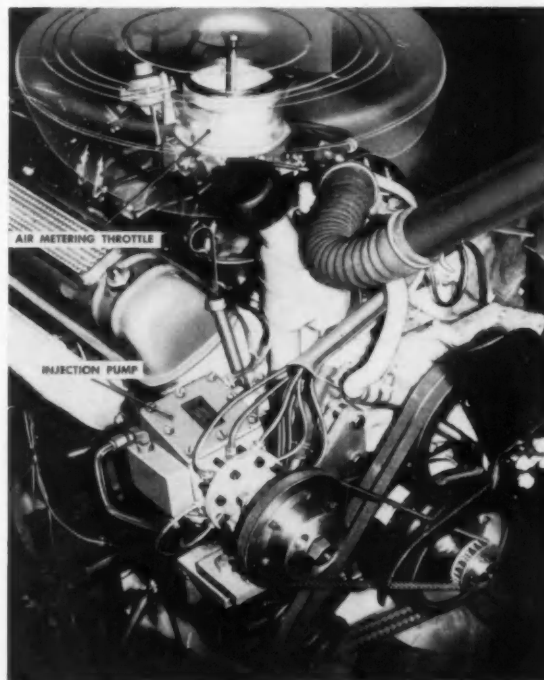
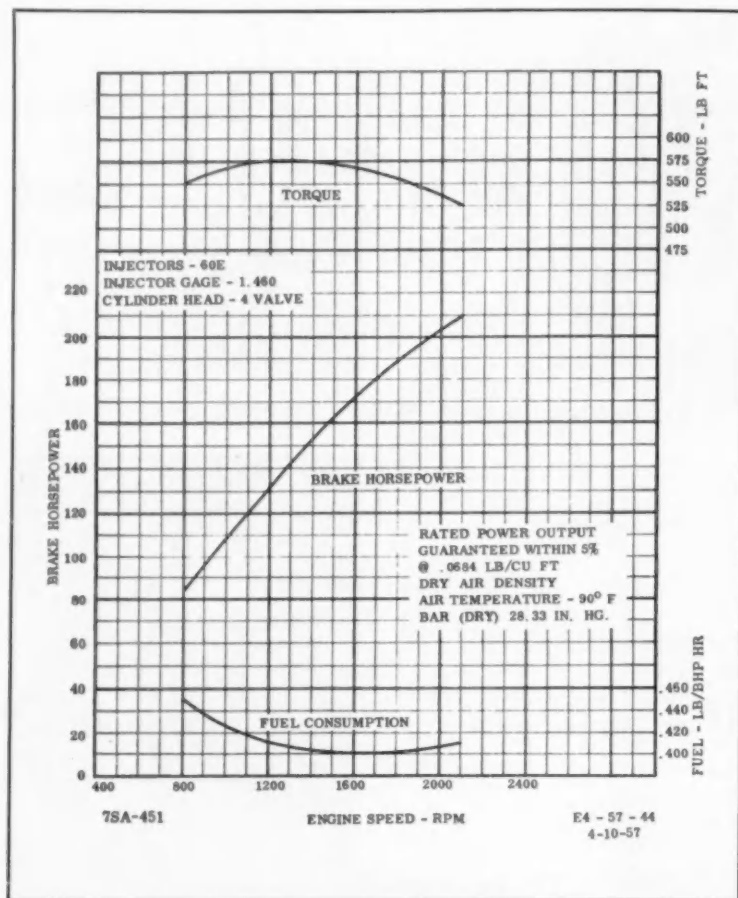
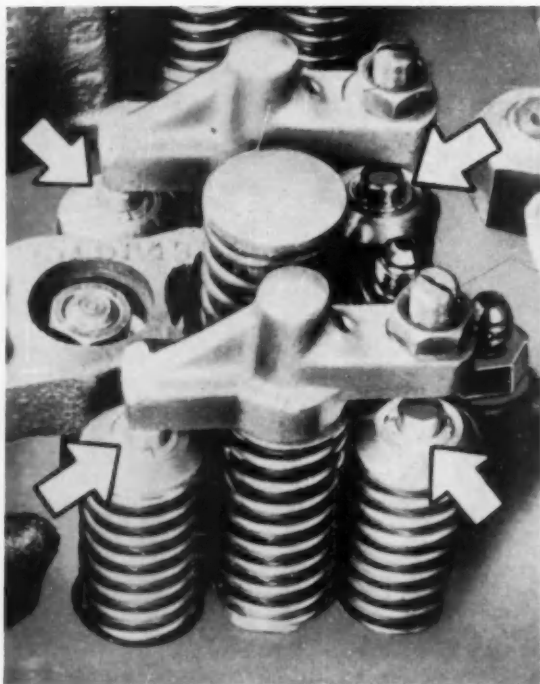


FIG. 5 — (below) Injection system installed on a 1957 passenger car engine





Performance curves of the Model 6-71 E Diesel



Valve arrangement in the new Series 71 E engine

GM

Detroit Diesel

Brings Out

New Line of Engines

A NEW line of Diesel engines, developed for trucks and buses, has been announced by the Detroit Diesel Engine Division, General Motors. The new series, 71-E and 71-T engines, are available to truck and bus manufacturers for installation as original equipment in four- and six-cylinder models.

The added economy of the new engines is derived from improved combustion and freer engine breathing.

The engines will power trucks and buses ranging from 26,000 lb gross vehicle weight to 60,000 lb gross vehicle weight and up.

The "E" series has four exhaust valves per cylinder, instead of the conventional two, to insure the expelling of all exhaust gases. Fuel injectors have a newly designed spray tip which more completely atomizes the fuel for more efficient combustion and to reduce fuel consumption.

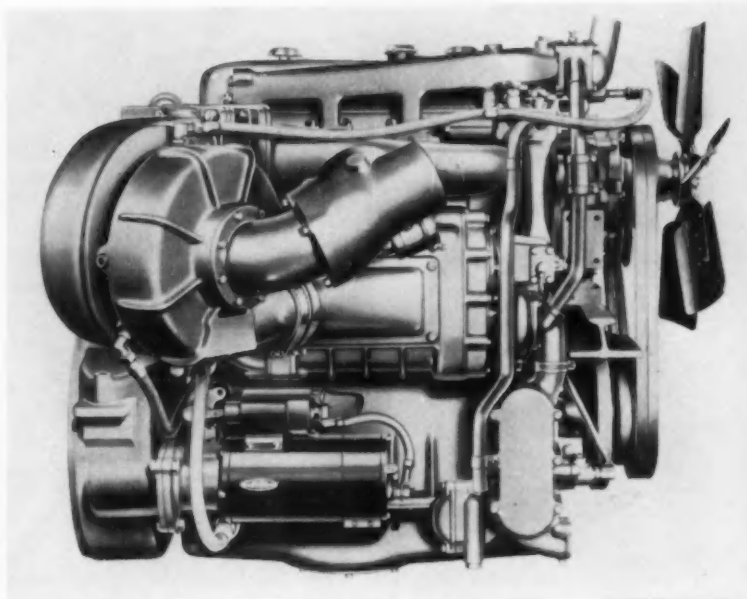
An increase of 38 per cent in cylinder liners' air inlet area will result in cooler piston operation and longer engine life. A newly designed top compression ring will also add to piston life and engine power. A new high-capacity, low-speed blower, packing more fresh air into the cylinder, results in greater engine efficiency.

These improvements are said to result in better highway perform-

ance and measurably better economy than the present 200,000 to 250,000 miles between overhauls.

The four-cylinder 71-E has a basic brake horsepower rating of 140-hp at 2100 rpm; the six-cylinder is rated at 210-hp at 2100 rpm. The engines are rated at 1500 ft elevation, at 90 F, a purposely conservative rating method to allow truck manufacturers to choose transmissions, differentials, and tires sizes for required on-the-road performance without de-rating.

The 71-T series includes a turbo-charger which is said to increase net horsepower without additional fuel consumption. The four-cylinder 71-T has a rated horsepower of 171 at 2300 rpm, the six-cylinder is rated 236 at 2100 rpm.



Right side view of the four cylinder 71 T Model engine with turbocharger

Rise in Prices Parallels Increase in Unit Labor Cost

IN reviewing causes of current inflationary tendencies, Guaranty Trust Co. of New York observed that "in politics, apparently, inflation is not where you find it but where you want to find it."

The bank's business and economic review, *The Guaranty Survey*, noted that a Senate subcommittee's inquiry into economic conditions has centered on price "administration" of manufactured goods, specifically steel. At the same time, the group has ignored the "administration" of wages by industry-wide unions and the "administration" of prices of farm products under the price-support laws.

Statistics indicate that most of the rise in living costs over the last five or six years has not been due to a rise in prices of commodities but to rising costs of services, such as transportation, medical care, laundry and rent, according to the publication.

"Changes in prices of finished products have always closely paralleled changes in labor costs per

unit of output," the Survey reports. "Output per man-hour rose 33.6 per cent from 1948 to 1956, while hourly earnings increased 46.7 per cent. The result was a rise of 9.8 per cent in unit labor cost, approximately matched by an increase of 10.1 per cent in prices of finished goods."

The experience of U. S. Steel in 1948 is cited as an example of the ineffectuality of a single company's or industry's efforts to check inflation. That concerned a reduction in prices in lieu of an increase in wages, but it lasted only three months because wage increases in other industries contributed to rising costs of living for steelworkers as well as everyone else.

"The upward pressure on prices is world-wide, and the conditions underlying it, causing it, or permitting it, vary to some extent in different countries," the Survey says.

Among factors specified are farm policies, full-employment programs, escalator clauses, governmental loans and subsidies, inconvertible currencies, budgetary extra-

gance, currency devaluation and balance-of-payment abuses.

These are described as "the old attempt to improve men's lot by providing them with more money. In the present instance, labor-union pressure, the 'cost push,' is the most immediate and most visible activating force. Yet the underlying cause goes far deeper. Currency stability is in peril because the people, in their pursuit of other aims, have rejected the discipline that currency stability requires (and) without currency stability all the other aims are illusory."

Guaranty credits balanced Federal budgets and the "steadfast refusal of Federal Reserve authorities to yield to political and popular pressure for cheap money" as being the main factors opposing inflation.

While these factors have been only partly effective because of the vast earlier increase in the money supply and the fact that there has been ample room for a rise in the velocity of circulation, the Survey declares that:

"The ultimate problem will not be to make the stabilizing policies effective but to reconcile them with the 'full-employment commitment' on the one hand and to prevent them from arousing irresistible political opposition on the other."



FIG. 1—First station on the Fisher Body line for assembling doors for Buick and Cadillac bodies. After the press pierces and clinches three nuts and an armrest reinforcement, a Sahlin Iron Hand transfers the panel into a turnover.

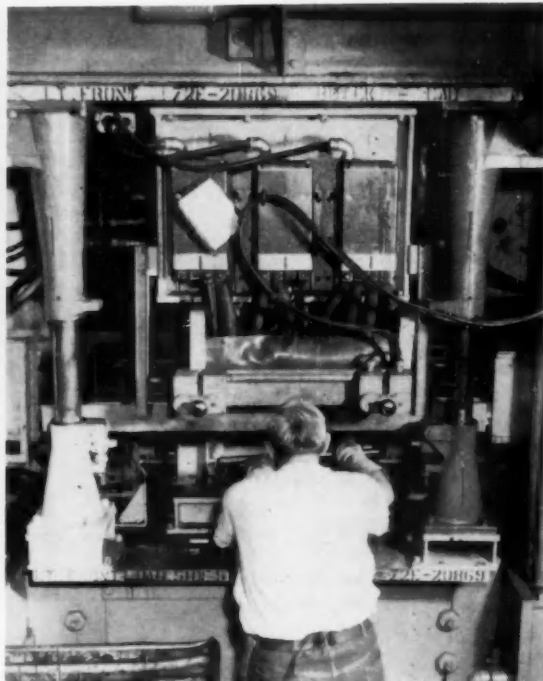


FIG. 2—In this press, a belt reinforcement is welded to an inner door panel adjacent to the window opening. Anti-repeat shot pins prevent the die from closing until they are withdrawn when hands press separate palm buttons.

By Herbert Chase

Automated Door Assembly Line at Fisher Body Plant

AUTOMATION is far from being a new departure in Fisher Body Division plants but the devices employed for automation are constantly being improved and increased in number. Primary objectives are to minimize manual labor and to see that all manual operations are performed safely, accident hazards being minimized.

Before automation is applied at any point or the extent of its use is increased, however, careful studies are made to be sure that the savings attained fully justify the expense involved in providing, installing, and maintaining such added equipment as is needed. Lines on which high production

rates are required over long periods usually justify a closer approach to complete automation than do those in which much more limited production is anticipated. Often expensive equipment that requires extra maintenance is added for safety reasons, regardless of the cost.

Door assembly lines, such as that here described, commonly justify extensive automation because total output is large and can be expected to continue over long periods with only minor changes. As many component parts are applied to more than one make of car (Buick and Cadillac in the case here considered) and each body requires

two to four doors, a large total output is assured.

In the first operation on the Buick-Cadillac door line, a Danly press, Fig. 1, is used to pierce and clinch three nuts and two arm rest reinforcements to an inner panel. Formerly, some spot welding was done in this press but this is not now required. When the press opens, a Sahlin Iron Hand picks the panel from the press and drops it onto a turnover that brings the reverse side up for automatic loading onto a shuttle and advance through the next operation.

At the second station, the shuttle advances the piece into a welding die to spot weld reinforcements

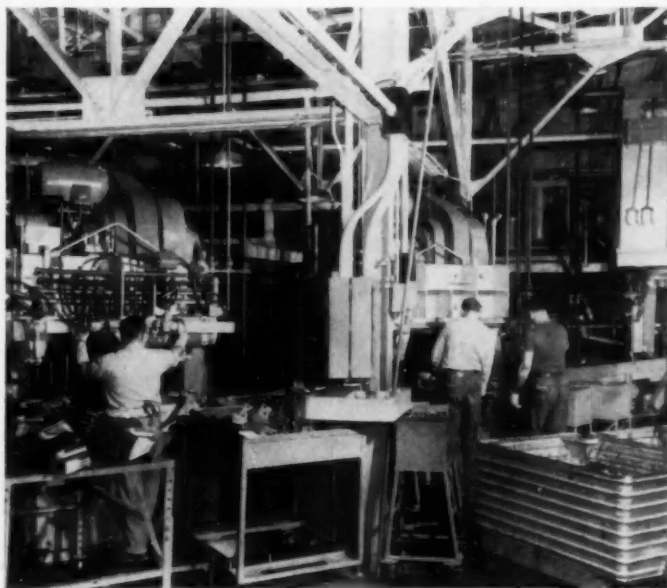


FIG. 3—Three presses that spot weld hinge reinforcements to a pillar, spot weld two hinge anchor plates and a hinge pillar sub-assembly to a door inner panel.

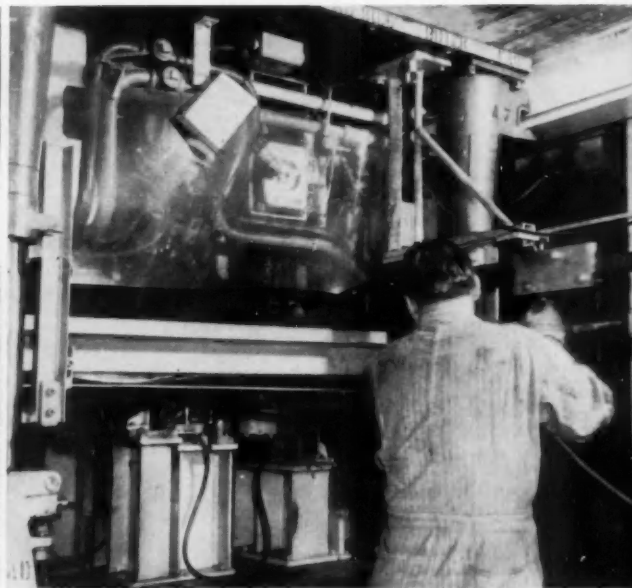


FIG. 4—Using a special transverse loading device to place a trim pad retainer in position inside a welding die, yet keeping the operator's hands well away from the die.

placed on the panel by an operator at each side of the press.

Fig. 2 shows the press in which a belt reinforcement is welded to the inner door panel at the window opening, the panel being shuttled through the press. In this press, the operator loads the reinforcement by hand but the press is equipped with anti-repeat shot pins that prevent the press from closing until the operator moves his hands from the loading area and presses dual palm buttons, one with each hand. When the die opens, the shuttle advances the panel onto a belt that carries the panel to a second welder in a Hamilton press, left in Fig. 3. There, the door panel and a hinge reinforcement sub-assembly are loaded by hand. In this, as in other cases, the press is closed by buttons on which both hands of the operator must rest in safe position. When the press opens, a shuttle carries the panel to the next press, center, Fig. 3, where hinge anchor plates with retainers are spot welded to the hinge pillar.

Unloading is again done by a shuttle that loads the inner panel into the Hamilton press, right in Fig. 3, where the hinge pillar sub-assembly is spot welded to the

panel along with a trim pad retainer. This retainer has to be placed a considerable distance inside the die.

To keep the operator's hands out of the die, loading is done by a slide on a transverse track shown at right in Fig. 4. The sliding holder is loaded well outside the press and is advanced by hand to locate the trim retainer in correct position for welding. Then the loader is withdrawn by hand but the press cannot close until the loader clears the die and trips a limit switch, top right in Fig. 4. At no time does either of the operator's hands enter the die.

After this operation, the air controlled shuttle advances the panel into the third Hamilton press, Fig. 5, where a window stop is spot welded in correct location. Placing of this stop is done with a magnetic stick so that hands are again kept out of the press. To close the press, the operator lays the stick on the bench from which parts are picked up and uses both hands to press palm buttons.

When this press opens, the shuttle advances the panel onto an incline to an operator who loads the panel by hand into the die in a

Cleveland 260 D press that spans the outer contour flange for better fit with the outer panel and to insure good finish on the outer door surface. Unloading of this die is by the automatic Sahlin Iron Hand shown in Fig. 6, the panel being dropped onto rails from which it is loaded by hand into the piercing die, left in Fig. 6. Punches of this die are moved in hydraulically to pierce holes for subsequent fastening of weather strips. From this die, a shuttle pushes the panel onto a transverse belt.

As already indicated, some sub-assemblies are needed for the inner panel. They are prepared in simple press and spot welding operations along a short line set at an angle to panel line. Handling between operations is by belts and a belt at the end of the line delivers the assemblies to the point where they are applied along the inner panel line already described.

Outer door panels to be joined to inner panels (prepared as above indicated), are conveyed from the main press department by monorail and are loaded by hand, one at a time, onto a shuttle at the start of the second portion of the door assembly line, with the inner side

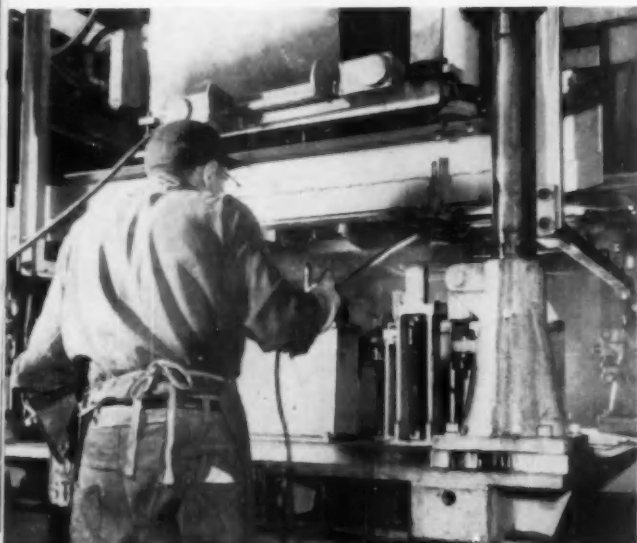


FIG. 5—With the magnetic rod here shown, the operator loads a window stop near the center of a welding die and thereby avoids putting his hands inside this die. Tripping of the press is with two palm buttons.

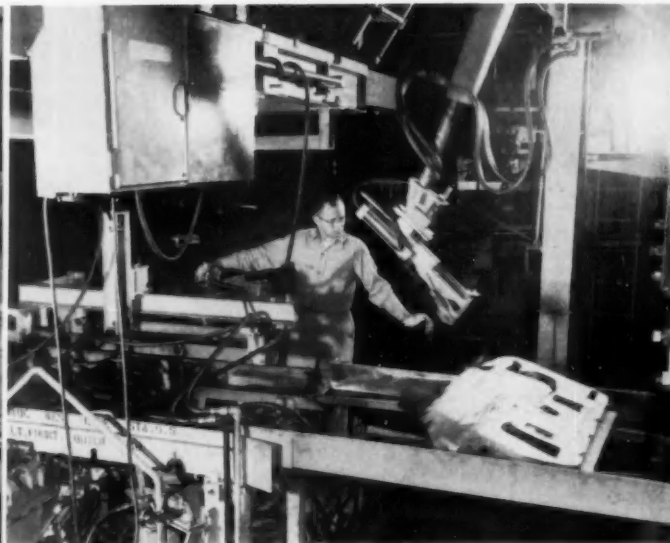


FIG. 6—After the inner door panel, right, is pulled from a spanning die by the Sahlin Iron Hand, the panel is pushed by hand into the die at left for hydraulic piercing of 18 holes for weatherstrip fasteners.

down. Advance of the shuttle carries the panel into the spray station shown at right in Fig. 7. There, the outer panel is air clamped by a pad from above to a frame, below which are nozzles for automatic spraying of a deadener compound onto the inner surface of this panel. Air jets from above keep the deadener from filling small holes that have to remain open.

As soon as the spraying is completed, the panel clamp is lifted and the shuttle advances the panel to the position shown in the center of Fig. 7. There, a vacuum cup turn-

over grips the panel and rocks it through 180 deg onto rubber covered rolls under a wire guard designed to prevent possible injury in case of vacuum failure.

Rolls advance the outer panel to a Bliss EB 29 press equipped with a welding die into which the panel is loaded by hand along with a narrow reinforcement that is spot-welded to one edge of the panel where no deadener was deposited. After another minor spotwelding operation, the panel is advanced along rolls to a station where an inner panel, brought by belt from

the line already described, is placed inside the upturned flanges of the outer panel.

Then, the two major door panel assemblies are moved into a Cleaning press die that locates and spot welds the two at several points. From this operation, a belt advances the door assembly into a Cleveland 260 D press die that wipes and forms the flanges of the outer panel down over those of the inner panel, locking the two parts together around the periphery of the door.

After this operation, the door

Dry Compressed Air

By A. N. Gustafson, Chief Engineer,
Schramm, Inc.

WET compressed air is an expensive nuisance. How does water get into compressed air lines? How can it be kept out? The answers to these questions become increasingly important as compressed air is used to power a growing number of tools, ma-

chines, and pneumatic diaphragm valves and controllers. Sand blasting machines, soot blowers, material conveyors, sensitive control instruments, paint equipment and liquid atomizers and agitators are run by air.

There are several ways to elimi-

nate water from air lines. In all cases, correct piping and draining will help. Where this alone is not adequate, aftercoolers can be employed to condense the water before the air is distributed. For unusual application where cooling water is not available, or where air lines must pass outdoors through freezing temperatures, special desiccant dryers may be used.

Correct piping and draining will often provide reasonably dry air at the point of use. Even though

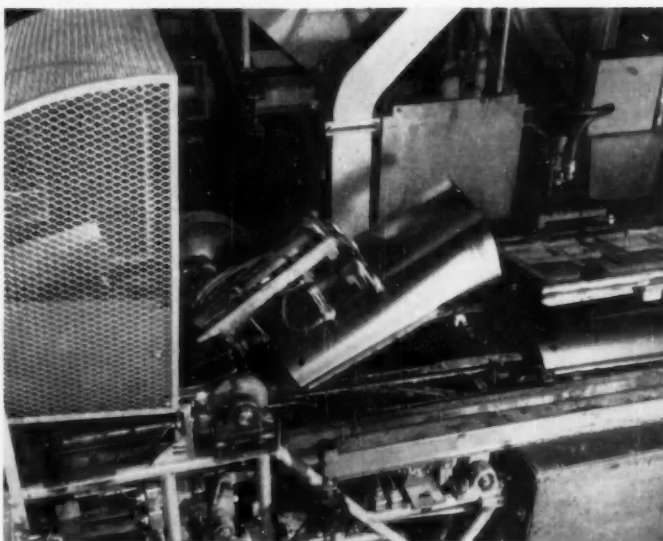
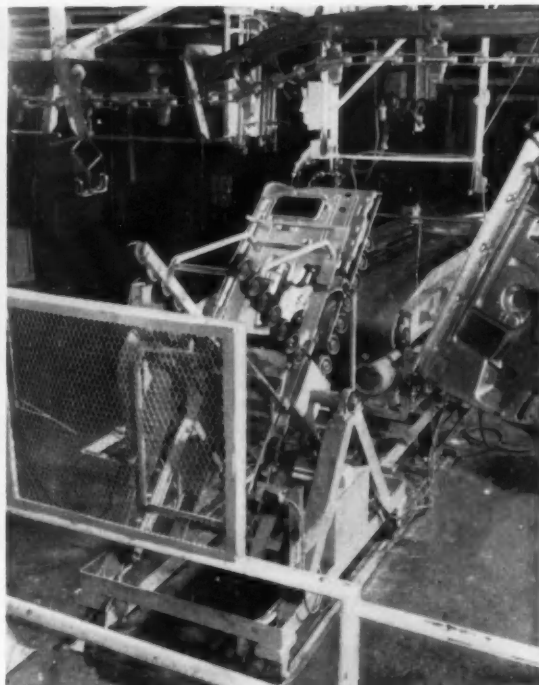


FIG. 7—Setup at right holds an outer door panel while deadener is sprayed onto its underside. After shifting to the position at center, a vacuum pickup turns the panel over for advance to the next operation. **FIG. 8** (illustration at right)—The belt (background) at the end of the door assembly line moves each door into the cross-shaped interlocked transfer device which is synchronized by limit switches with hooks advanced by the overhead chain and, as the door is rocked into vertical position, one of these hooks enters a large hole near the top of the door. As the



hook continues to advance with the chain the completed door is lifted out of the transfer device and to body assembly.

assembly is moved out of the die onto a belt that carries it to the final Hamilton press, where hand loading of the welding die is done. This die makes a series of spot welds around the triple-thickness flange produced in the prior operation. Discharge from this press is onto a belt shown in Fig. 8.

From this belt, the door feeds automatically along rubber rollers into a cross shaped transfer unit,

foreground of Fig. 8. This unit is synchronized by limit switches with hooks advanced by an overhead chain and, as the door is rocked to vertical position, one of these hooks enters a large hole near the top of the door. As the hook continues its advance with the chain, the completed door is lifted out of the transfer device and is carried away from the door assembly line. Thereupon, the

transfer unit is rocked to a position to receive the next door advanced by the belt.

Setups here described can complete the assembly of 500 doors an hour and are so designed that, when suitable changes in dies are made, either right or left front or rear doors (of so-called C39 bodies) for four-door Buick and Cadillac cars are produced on the same production lines.

additional drying methods are used, attention to installation details will help to provide air that is satisfactory.

One of the simplest and most effective ways to decrease air contamination and increase compressor efficiency is to locate the compressor intake carefully. For efficiency, the intake should preferably be outside the building, on the coolest side. The greater the differential between outdoor and indoor temperatures, the greater will

be the economy.

Care must be taken, however, to avoid locating the intake near steam or air exhaust vents, which would add moisture to the air. The location should also be free of fine industrial dusts or pigments or any other source of contamination. Avoid sulfurous or chlorine-contaminated atmosphere—these substances mix with moisture to produce weak acids, which will attack screens, tools, and piping.

If the receiver is the vertical

type, air should enter at the top, so that moisture can fall directly to the bottom, where it will collect. The outlet from the receiver should be in the shell, near the top. A drain must be installed in the bottom of the receiver, and should be opened daily to remove all accumulated water. If automatic drainage is desired, an automatic trap can be used—preferably of the inverted bucket type. A similar arrangement should be used with

(Turn to page 180, please)

Special Holding Fixtures for Machining Aircraft Parts

Presented Here is a
Pictorial Description
of the Removal of 89
Per Cent of a Billet to
Make an Important
Aircraft Part

By B. C. Von Aspe
Superintendent-
Fabrication
DOUGLAS, TULSA DIV.

THE pursuit of strength, lightness and precision is commonplace in the aircraft industry but few are aware to what extent this necessary fetish must be carried. This is particularly

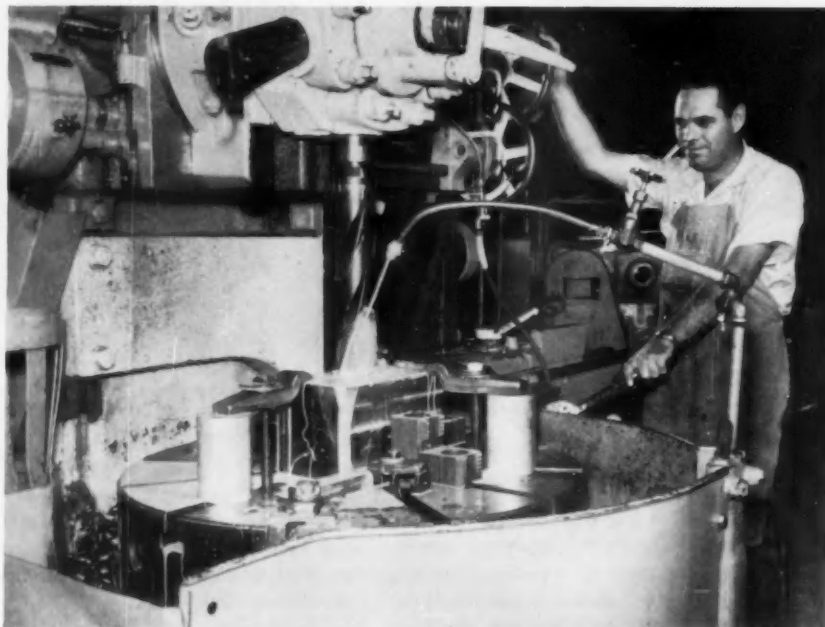


FIG. 1—After the 6¼ by 6¼ by 12 in. billet has been sized for tooling purposes on a Cincinnati-Gilbert boring mill using carbide shell end mills, operation No. 2 begins. On this vertical Bullard turret lathe a hole is being bored at the location of the finished bore. A counterbore was first made to a 4.600-4.602 in. diameter to a predetermined depth of tooling purposes. An undercut is then made with a form cutter holding a 0.910 in. width dimension, and a 3.32 in. radius. This provides for material on subsequent operations after heat treatment.



FIG. 2—Before coming to this No. 4 Kearney & Trecker universal mill, the part was template sawed on a DoAll to remove surplus material; it was step cut 2.44 in. deep by 2.00 in. wide across the part on a Kearney & Trecker No. 4 vertical mill so that tooling holes could be drilled and tapped on a five-foot Fosdick radial drill. Then, as shown here, roughing cuts were made with a carbide shell end mill to cut down on profiling time. This universal was used to machine the compound contour of the piece.

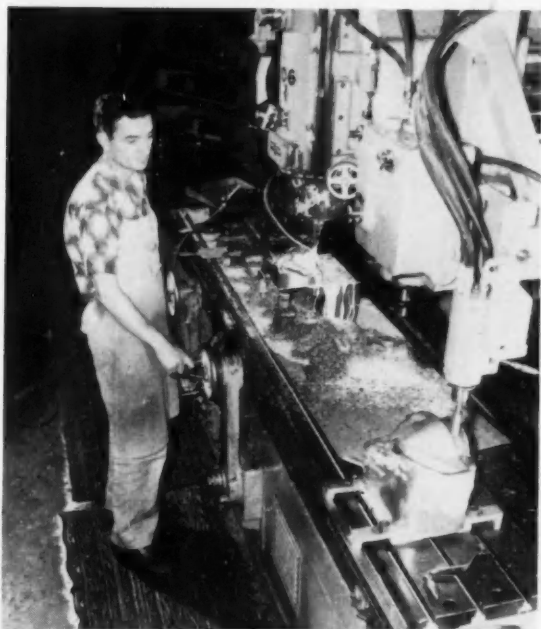


FIG. 3—A Cincinnati Hydrotel is used to contour the end back side of caps.

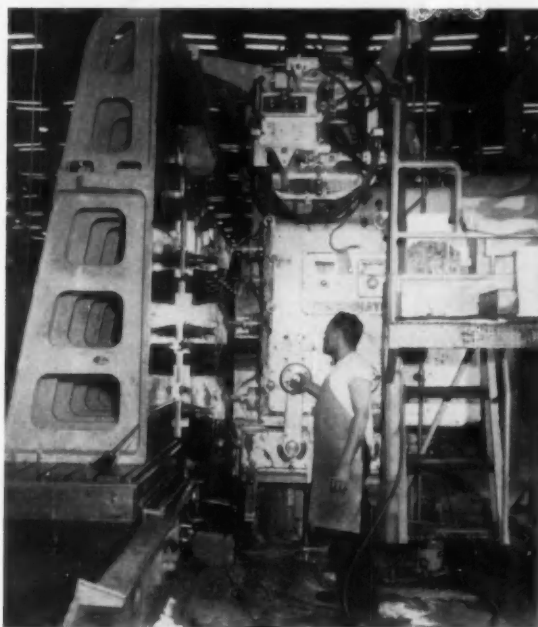


FIG. 4—Because of rigid schedule requirements, a three-spindle Cincinnati Profiler is employed to contour the end back side of caps in addition to the Hydrotel.

true in highly stressed parts made of steel.

Twenty-seven operations remove over 89 per cent of the weight of a 175 lb forged steel billet at the Tulsa division of Douglas Aircraft Co. The finished product, a bearing cap for the landing gear of a bomber, is a precisely polished functioning part that weighs only 19 lb. The tooling holding fixtures are worthy of note throughout.

More Pictures, Next Page

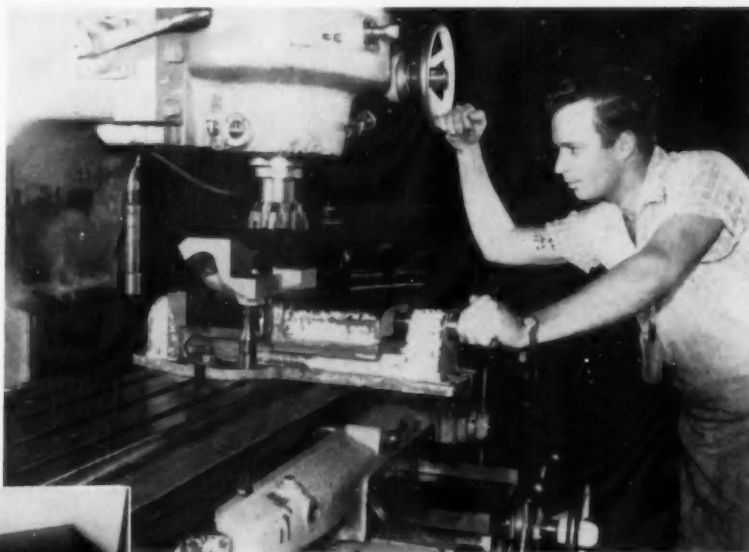


FIG. 6—A surface cut is next made on this No. 3 Kearney & Trecker vertical mill to true up tooling surface.



FIG. 5—Excess material is removed from the piece on this No. 36 DeAll hand saw before heat treatment where the metal is treated to 150,000-170,000 psi and then drawn back to 155,000 psi to assure best machineability. Parts are sand blasted and magnetically inspected after heat treatment.

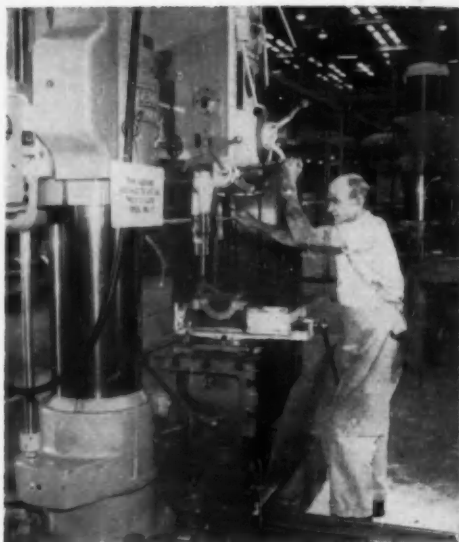


FIG. 7—Two previously drilled and tapped holes are reamed to 0.750 in. for locating on future tools. This is a five-foot Fosdick radial arm drill.



FIG. 8—Parts are now milled to 5.180 in. from center line for each end on this Kearney & Trecker horizontal mill using a carbide shell mill. These are net dimensions.

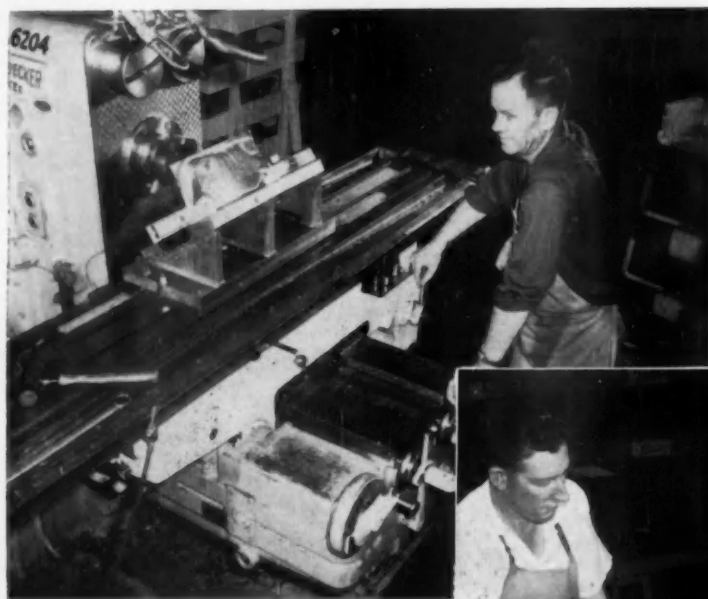


FIG. 9 — Rough mill cut on angle and on top surface is made on this Kearney & Trecker mill.

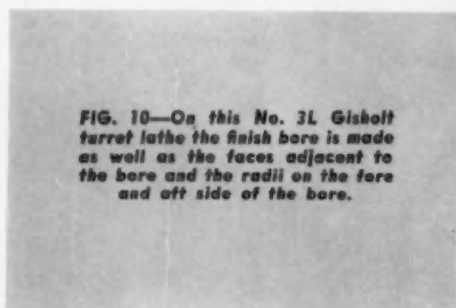


FIG. 10—On this No. 3L Gisholt turret lathe the finish bore is made as well as the faces adjacent to the bore and the radii on the fore and aft side of the bore.



AIRCRAFT PARTS

.. Continued ..

FIG. 11—Using the same fixture as in Fig. 10 on this No. 5 Kearney & Trecker vertical mill, the spot facing was done first with a flute end mill due to the odd shape of the piece. The second operation was slot milling with a standard end mill.



FIG. 12—Before reaching the No. 4 vertical Kearney & Trecker, the part was angle milled with an 8 in. carbide shell mill and slotted with high speed end mills. At this machine, side cuts were made to finish dimension. A carbide cutter was used to machine one side but insufficient room on the opposite side prohibited its use. A small fly cutter with carbide insert was used. Turntable was used to follow angle cutting.



FIG. 13—The high speed steel cutter is the star of this operation. It is a special pear-shaped cutter, $\frac{7}{8}$ in. in the shank and belling at the bottom to 1.860 in. The mill is a Kearney & Trecker No. 4 vertical.



More Pictures,
Next Page

AIRCRAFT PARTS

... Concluded ...



FIG. 14—On this Cincinnati a boss is being milled and coordinated to the previous spot face operation to hold a minimum spot face to boss dimension. FIG. 15—(Above right) Minor detailing on both vertical and horizontal mills preceded the hand work. This hand work included the fin-



ishing of the back side of the cap from Hydrotel operations, the forming of all radii on corners and steel stamped for identification. Finally the part is again magnetically inspected, checked for hardness and dimensional integrity plated and finally painted.

Cost Reduction in the Press Room

By John F. Bergmann, Pivot Punch & Die Corp.

IF you have considered making a cost reduction study in the press room, the following information should assist you.

Many companies are becoming aware of the high costs of unnecessary press downtime, examining the cause of press downtime and are taking cost reduction actions which are resulting in increased profits for their corporation.

One of the largest automotive manufacturers recently conducted such a study and by simply concentrating on one of the major reasons for their press downtime effected a reduction of over 67 per cent on losses that they previously sustained due to punch wear and breakage. This company considered four factors in their losses.

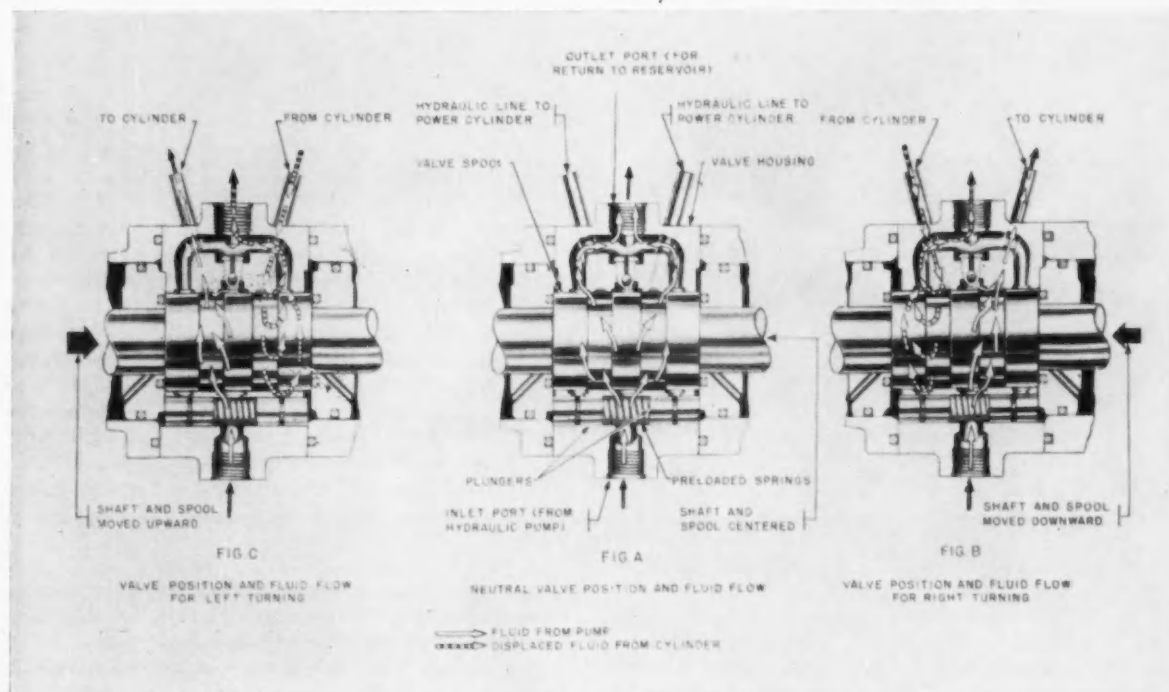
- 1) Costs of pieces not produced when inferior tools were used.
- 2) Costs of die maintenance manpower.
- 3) Values of adjusting tight press schedule to avoid costs of premium time.
- 4) Difference in costs of additional tools.

Another company in Los Angeles conducted a survey of press downtime and found that the use of one company's commercial punches rather than the ones they had previously used reduced their press downtime by 50 per cent. This company used two factors for determining their losses: production losses in dollar value of parts not produced, and dollar costs of die maintenance.

Here are some recommendations based on the experience of manufacturers who have studied these losses and made measurable strides towards eliminating press downtime.

The first step in undertaking a study is to determine why your presses stopped for any reason other than normal die change. Press downtime is the period involved when a press stops to have a punch replaced, the die removed to be resharpened, repair of a mechanical failure in the press, malfunction occurring in the die, or the human element of error on the part of the press operator.

Second step is to assign the responsibility for determining losses to a management function responsible for operating efficiency. Press room foremen and superintendents must be made aware of the importance and values of the survey and take an active interest (Turn to page 172, please)



Operation of the control valve and flow of fluid

Construction and Operation of the Ross HPS Power Steering Gear

THE Ross HPS type is a semi-integral hydraulic steering gear which incorporates a control valve on a single stud cam and lever mechanical steering gear. Effort applied to the steering wheel actuates the valve which, in turn, directs hydraulic fluid from the pump to a power cylinder located in the linkage.

This new power steering gear is intended for very heavy duty vehicles and off-highway equipment. It is suitable, however, for over-the-highway trucks, and for industrial lift trucks and tractors. The semi-integral type provides greater flexibility in installation because of compact design.

The action of the steering gear is both manual and hydraulic in

effect. When the cam is turned to the left or right, by the driver's effort on the steering wheel, the stud of the lever is moved through the groove of the cam (worm), thus rotating the lever shaft and providing angular movement of the steering gear pitman arm. Whenever the driver's effort at the steering wheel exceeds the preload of the control valve centering springs, the hydraulic system comes into operation to provide power steering.

The valve is the control center of the hydraulic system. The valve housing has several internal oil channels into which the oil flow is admitted or restricted, according to the position of the valve spool.



Phantom view of the Ross HPS70 hydraulic power steering gear

The spool moves axially with the cam (worm). These parts are
(Turn to page 144, please)

Aircraft Ignition Problems Studied at Fourth Annual Bendix Conference

By Andrew W. Shearer

NEARLY 200 representatives of major domestic and foreign airlines, engine and parts manufacturers, the Armed Forces, and Bendix personnel participated in the recent Fourth Annual Aircraft Ignition Conference conducted by Scintilla Div. of Bendix Aviation Corp. Held in Sidney, N. Y., the three-day (Aug. 20-22) meeting was devoted mainly to question-and-answer sessions on operational and maintenance problems of ignition systems for both reciprocating and jet engines.

A major portion of the program was allotted to discussions of the R-2800, R-4360, R-3350, and R-1820

low tension ignition systems. Only one brief session was devoted to high tension ignition, as this type of system continues to diminish in importance. While not receiving the same degree of attention that it did last year, jet ignition did stir considerable interest. The consensus seemed to be that limited experience thus far with gas turbine ignition systems has been productive of good results.

Before the conference was thrown open to debate, Scintilla engineering activities of the past year were reviewed. Important developments of interest to AI readers are outlined below.

R-3350 Low Tension System

AN open-core molded type of transformer coil has been built and sent to Wright Aeronautical and Lockheed Aircraft for testing. Results of tests conducted thus far have been satisfactory, and others are in progress. The new molded coil will replace the hypersil coil now used. Also under development is an improved "Y" lead to correct chafing and moisture problems experienced with the present unit.

Expected to be available soon is a redesigned DLN-9 magneto top bearing support (see Fig. 1). The bearing retainer shown in the illustration and the four studs which hold it in the top of the magneto constitute a kit. By a simple rework process, the bearing retainer can be mounted directly in the top of the housing to provide greater strength in the assembly.

At last year's conference, a mock-up of a new distributor design with an electrical disconnect from the harness manifold (see Fig. 2) was displayed. It has a bolted-on cover replacing a band clamp and a separate mounting flange bolted to the lower bowl. A number of these distributors have been built and are now under test at Wright Aeronautical.

Highlight of the conference was the discussion of Scintilla's work on development of a high frequency system. Its efforts in this direction gain particular

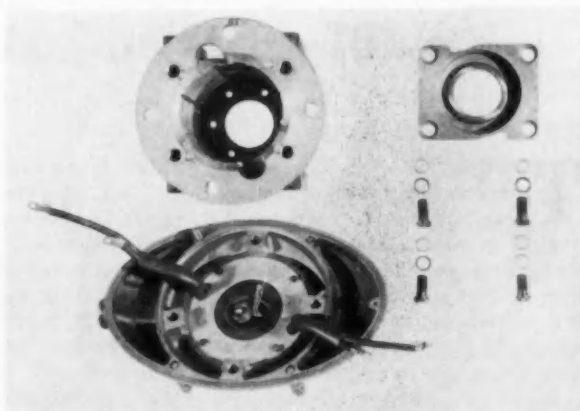


FIG. 1—Redesign DLN-9 magneto top bearing support for R-3350 engine. Complete kit includes reworked parts (left) and new parts (right).

significance in connection with a new fuel additive now being produced by Du Pont Co. and Ethyl Corp. Tests at Wright Aeronautical have shown that the new additive improves the detonation limit of the engine and allows a leaner mixture during operation.

The tendency of the additive to foul spark plugs

fired by the present low tension ignition system presented a problem. However, when tests were conducted on both single and multi-cylinder engines with a high frequency system no fouling was experienced with the fuel additive.

Electrical characteristics of the high frequency system, as compared to the low tension system, are shown in Fig. 3. It should be noted that this system is a purely high frequency system and not the so-called condenser discharge system described at the 1955 conference.

Fig. 4 shows a schematic diagram of the high frequency system. The direct resemblance to the low tension system is immediately apparent. Actually, the same electrical circuit as the low tension system is used.

The close similarity of the two systems is more graphically demonstrated in Fig. 5. It becomes obvious, then, that the high frequency system may readily be used with the low tension system. Electrically, the two systems are the same; the breaker points in the relay have merely been relocated into the magneto. By taking part of the high frequency converter coil and the high frequency coil, along with the spark plug, and using it with the low tension system, a high frequency system can easily be derived from present Scintilla operating equipment.

Scintilla has already completed work on portions of a mock-up system for high frequency equipment. In addition, it has under construction at the moment three converter systems (converter coils, transformer coils, and leads) which should be at Wright Aeronautical next month (October) for testing. Three complete systems are expected to be ready for testing in January, 1958.

R-2800 Low Tension System

DESCRIBED in considerable detail at last year's conference and reported in the October 1, 1956, issue of *AUTOMOTIVE INDUSTRIES* was the quill shaft and top timing distributor (see Fig. 6). The unit has been extensively tested by Pratt & Whitney and several airlines with good results.

The DLN-10 magneto with forged flange (see Fig. 7) includes a different type of housing with a separate cover for the coils, one on each side, and a small cover on the top for the end of the shaft and bearing. The housing and three covers are one-piece-bolted on the flange.

R-4360 Low Tension System

SOMETIME ago a change was made in the distributor finger for this system to clamp the tail of the spring. This was done to eliminate wear of the spring on the backup plate and reduce vibration that was wearing the phenolic sleeving inside of the spring. While plate wear was eliminated, vibration was only partially cut down.

Scintilla has now come up with a possible solution to the vibration problem that shows promise. A solid

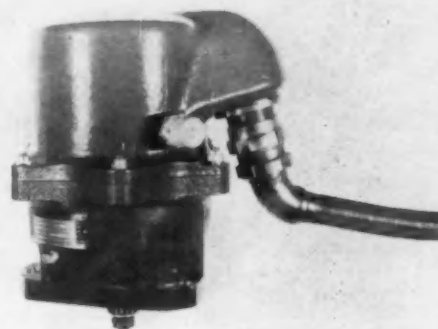


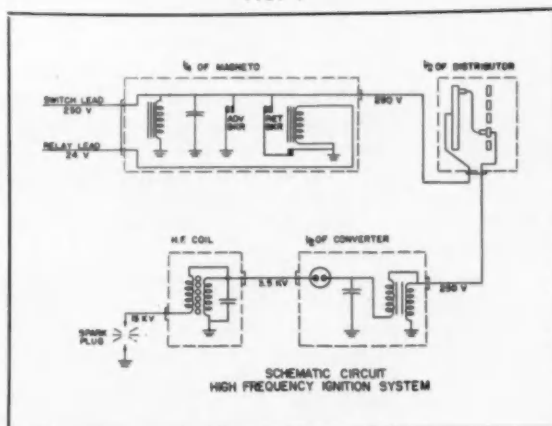
FIG. 2—New disconnect harness and distributor for R-3350 engine

FIG. 3

COMPARISON OF IGNITION SYSTEMS

| | LOW TENSION | HIGH FREQUENCY |
|---|-------------|----------------|
| ● SPARK ENERGY- JOULES | .015 | .003 |
| ● SPARK DURATION- MICRO SECS. | 3000 | 13 |
| ● AVERAGE POWER- WATTS | 8 | 250 |
| ● FREQUENCY- CPS | 4000 | 1,000,000 |
| ● TOLERABLE SHUNT RESISTANCE - OHMS (FOULING) | 250,000 | 10,000 |

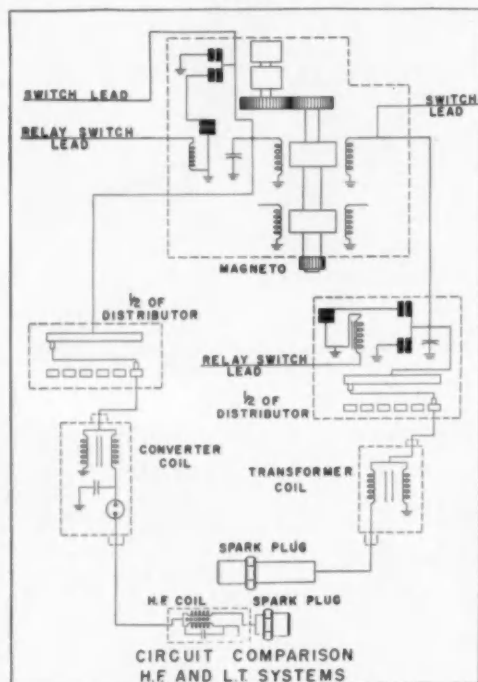
FIG. 4



phenolic rod is used through the spring, which is secured in the body of the distributor finger by a roll pin. Likewise, two "O" ring type of compression washers are used on each side of the spring.

Although the statement was made at the 1956 conference that Scintilla was discontinuing all development work on rewirable bank manifolds for the R-4360 engine, it is now building and delivering rewirable

FIG. 5



bank harness 10-83190 to the Air Force. This harness with a coil spring inner core and nickel braid and nylon coverings shows promise for civil transport use.

Other Developments

In addition to the major developments described above, a number of other Scintilla engineering activities merit mention.

Extensive research and experimentation continues on the thorny problem of breaker timing to the engine in reciprocating power plants. All kinds of cam materials, cam finishes, and lubricants have been tried to improve breaker operation. In this connection, Scintilla feels that lubrication and original timing of the breaker to the engine must be rigidly controlled, and minimum change that can be tolerated in the timing must be established.

Carbon brush testing has been proceeding at a good pace at Scintilla. Much of the testing has centered around the treated type of carbon brush. The Spear 7927 brush, presently under test, has shown good

Factories Installed More Power Assists in 1957 Cars

Automobile manufacturers installed more power assists—windows, brakes and steering—in 1957 model cars. Power seats, however, lost favor with the public, dropping from 7.6 per cent in 1956 to 7.1 per cent this year.

Power brakes and power steering, recognized as safety features as well as "luxury" options, showed the big-

gest percentage gains over 1956. Power brake installations increased from 25.3 per cent to 27.7 per cent, while power steering increased from 27.8 per cent to 34.7 per cent. Power windows showed a slight percentage increase, from 7.4 to 7.73.

Public Has Been Prepared For Dual Headlight Switch

The public should be ready to ac-

cept dual headlamps as standard items in 1958, when virtually every car built will be equipped with the year-old illuminating system.

During 1957 six makes had dual headlights as optional equipment or standard on certain models. Cadillac Brougham and Nash had them as standard; while Chrysler equipped 70 per cent of its cars with them; Lincoln, 98 per cent; Mercury, 32.6 per cent; and DeSoto, 39.7 per cent.

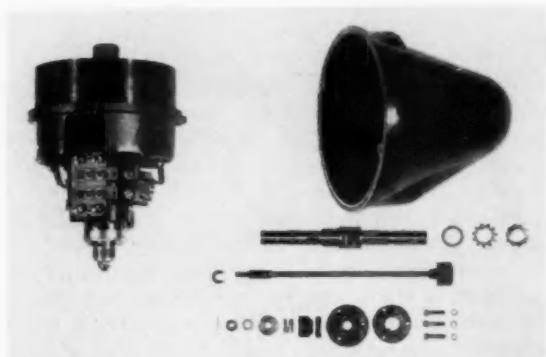


FIG. 6—Quill shaft distributor for R-2800 engine. Assembly is at left and kit required to convert standard distributor is shown at right

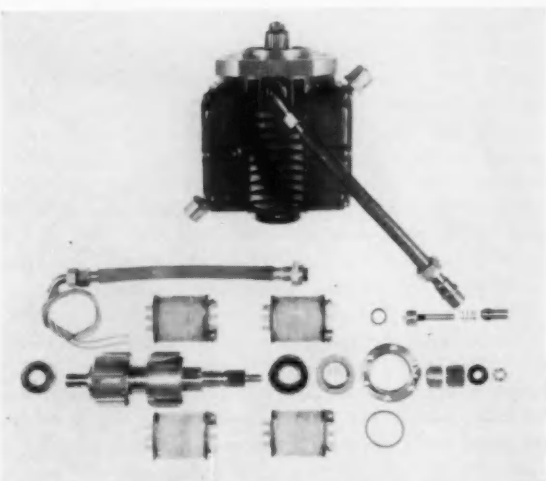


FIG. 7—Redesigned DLN-10 magneto forged flange for R-2800 engine

consistent results. Work is also going forward on distributor plate finishes.

Other topics discussed were more effective methods of using ignition analyzers and better techniques for scheduling and reporting distributor removals. The conference concluded with a tour of the Scintilla plant, where a 40,000 sq ft expansion is currently underway. A good percentage of the additional space will be used for Scintilla's rapidly growing plug-in connector business.

FRUEHAUF Trailer Co. has developed a tandem underconstruction for both fixed and sliding type units. Sliding suspension, of course, is used in trailers operated in areas where differing legal requirements make it advantageous to have variable rear axle positions.

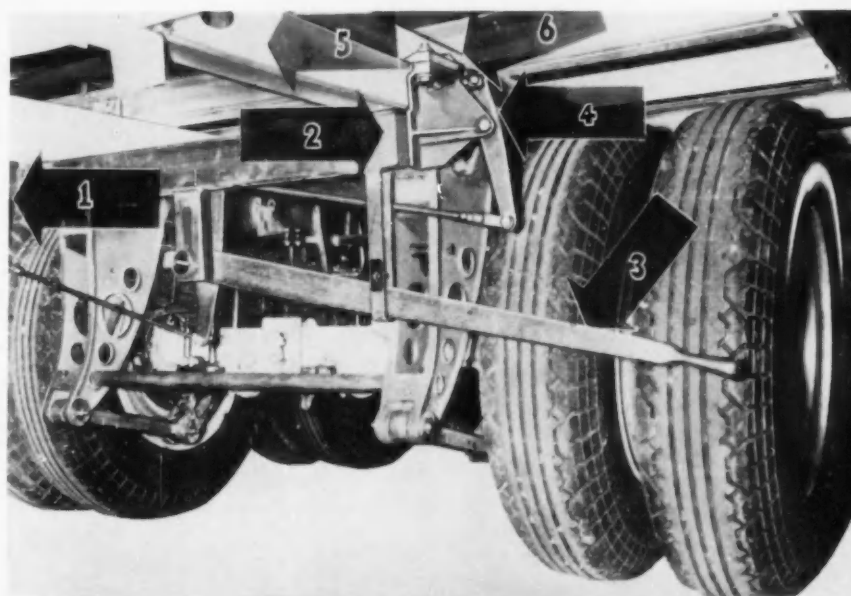
The new tandem underconstructions were developed particularly for strength with light weight. Other advantages of the new design include absence of lubrication fittings, adjustable radius rod on one side, with one-piece radius rods on opposite side, bonded metal mountings, improved spring location directly under the body and greater stability due to level radius rods.

The illustrations show the new sliding tandem which utilizes the adjustable axle position. It will be noted that mounting of the new sliding suspension is effectively secured by support on hat-shaped members designed particularly for this purpose.

Referring to the illustrations of the new development of the sliding tandem, arrows No. 1 and No. 2 indicate the two spring-loaded locking pins that lock the suspension directly to both the hat-shaped suspension supporting members. Arrow No. 3 indicates the accessible handle of the locking control level, shown in the depressed position. Arrow No. 4 indicates the spring loaded locking pins, designed to keep them engaged even if the actuating mechanism were shorn off due to any unforeseen emergency. One of the hat-shaped supporting members mentioned above is shown by arrow No. 5, while arrow No. 6 indicates one of the four heavy-duty clamps which anchor the suspension to the hat-shaped member.

The one-piece and adjustable radius rods provide adjustment for aligning the axle. All radius rod and equalizer pivots are rubber mounted and the rubber bushings are of the bounded type.

By mounting the spring hangers directly under the body instead of

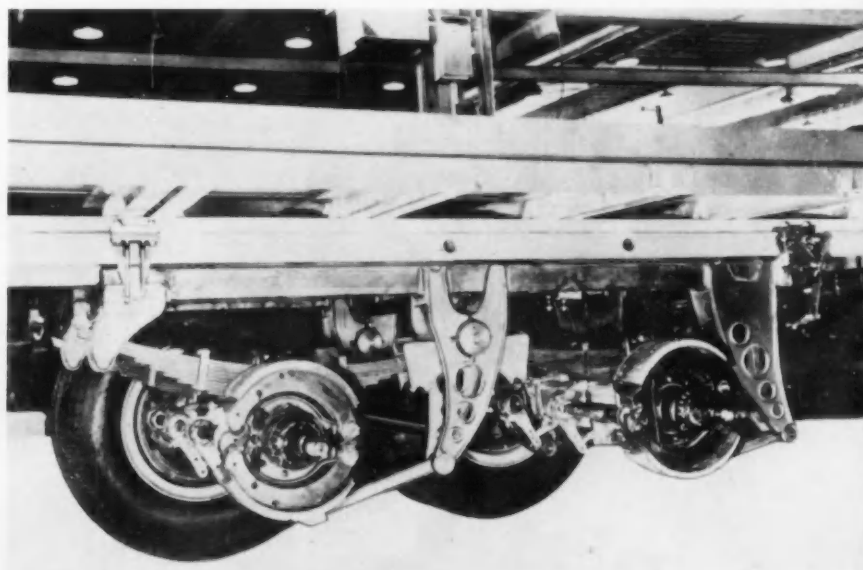


In this front view, looking to the rear of the new tandem underconstruction, arrows indicate parts identified in the text

Fruehauf Develops Improved Tandem Underconstructions

outboard on the chassis frame, no torsional stresses are transferred to

the frame rails, the load being supported vertically into the structure.



Side view of the tandem underconstruction with wheels removed discloses new suspension members

Dow Corning's New Laboratory

Recent Developments Revealed at the Corporation's Latest Facility

Dow Corning Corp., Midland, Mich., recently opened a new laboratory to study the fabrication of its silicone rubberlike formulations, offered under the general trade designation "Silastic." On display were the pieces of equipment in which the elastomers are compounded, tested, and fabricated for applications in industry. A large part of the output goes into the automotive and aircraft industries. In the aircraft industry particularly the heat resistance of silicone elastomers, combined with their excellent properties at low temperatures, makes them important materials for gasketing, ducting,

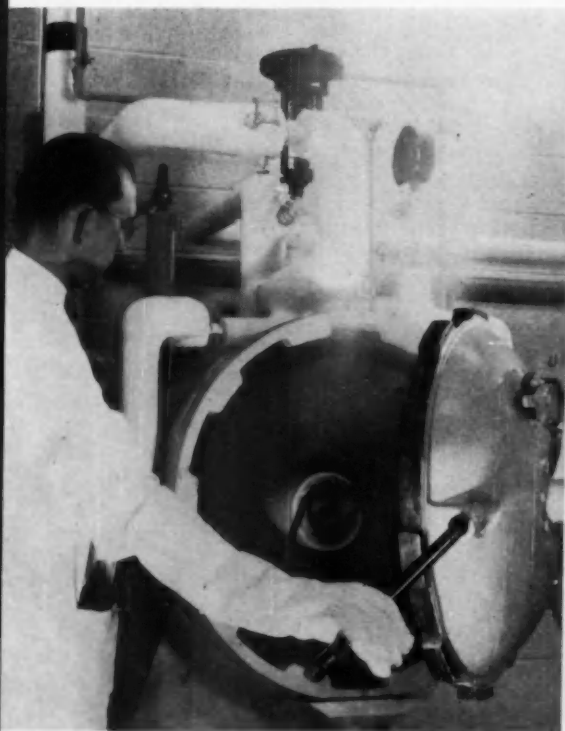
protective boots, and the like.

Representative of some of the newer silicone elastomer formulations and their applications in the automotive field is a recently announced heat-resistant type that will withstand aircraft fuels and oils.

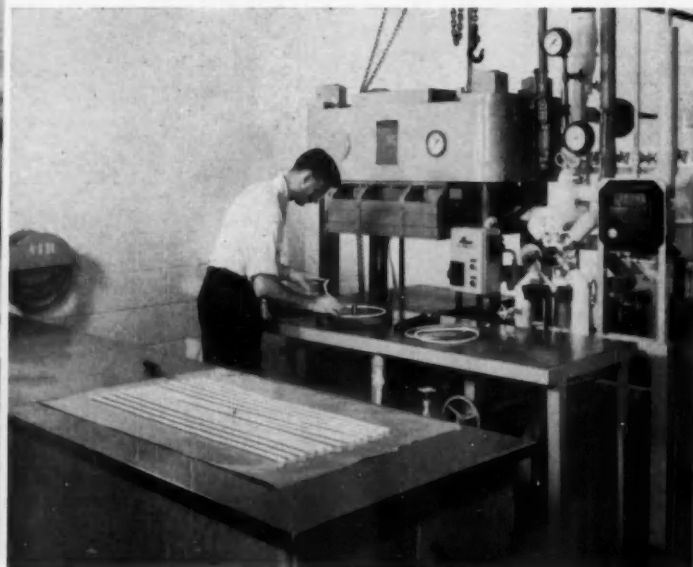
It was developed in collaboration with the Materials Laboratory at Wright Air Development Center of the Air Research and Development Command, and is intended for use on jet-powered planes. It combines the ease of fabrication of the silicone elastomers with the solvent resistance of the fluoro-carbon plastics, and is identified as a fluoro-silicone

elastomer. The combination material remains serviceable through a temperature range of from -80 F to above 400 F, and with this thermal durability it resists swelling and attack by gasoline, jet engine fuels, hydraulic fluids, and engine oils. It can be fabricated by conventional processes and on standard equipment used for silicone elastomers. Its immediate application is in the making of O-rings and other seals for aircraft.

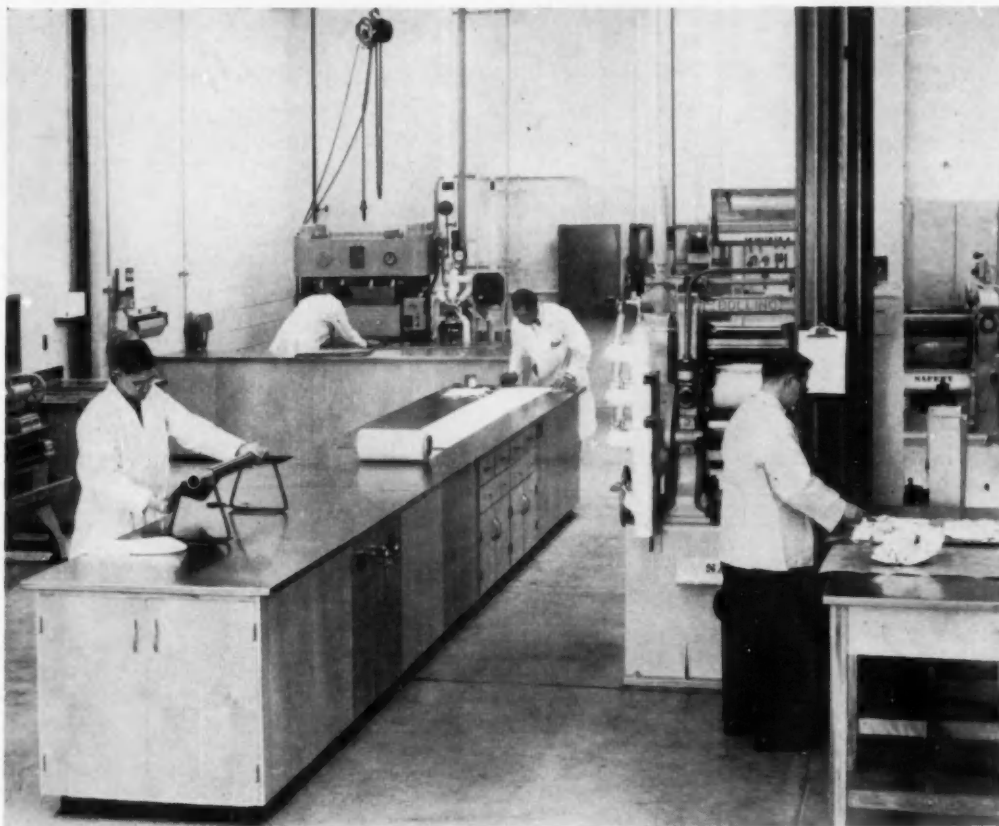
Another new formulation, announced by Dow Corning as the toughest, strongest, heat-stable silicone elastomer yet produced, is identified as Silastic 916. It has



Steam vulcanizing of silicone elastomer sheet in the new laboratory



Laboratory molding of O-rings in a steam heated hydraulic press



A corner of the new fabrication laboratory

a tensile strength of about 1500 psi, 50 per cent above the usual figure; elongation is over 500 per cent, and durometer hardness is 50 to 60 Shore A scale. The service temperature range is -130°F to above 500°F , and the material shows excellent resistance to compression set (permanent deformation under pressure) after prolonged exposure to elevated temperatures.

Some of the possible applications of this elastomer are in oven

door gaskets, aircraft door seals, wire and cable coatings, and oxygen masks.

Two new silicone elastomers developed primarily as coating stocks are designated Silastic 6535 and 2071. They have excellent bond strength, low compression set, and good stability under clamps as special characteristics. The first is offered as a liquid dispersion, intended for solution coating on glass cloth. It retains its resilience from 600°F to a brit-

tle point at about -178°F . The second composition is designed for calendering, though it can be extruded or molded also. It is easily processed. After 24 hr in a circulating air oven at 600°F , typical properties would include a tensile strength of 770 psi, Shore A scale hardness of 63, and 200 per cent elongation. Both stocks are suggested for such applications as hose and ductwork on jet engines and hot-air systems for aircraft.

More Cuts Are Slated In Military Spending

Further cuts in military procurement are in the making.

The Defense Dept. is now working out details of contract reductions and slowdowns that will wipe out up to \$1.5 billion in Army-Navy-Air Force purchase orders.

Pentagon officials concerned with procurement have received orders to hold spending in this fiscal year, which

ends next June 30, to \$38 billion. In addition, the Defense Department has placed the same ceiling of \$38 billion on spending in the following fiscal year, which ends June 30, 1959.

Goodyear Buys 3400 Acres For Guatemalan Plantation

Goodyear Tire & Rubber Co. will plant 3400 acres of hevea trees on its newly-acquired holdings in southwest Guatemala. A Guatemalan subsidiary

corporation, Goodyear Rubber Plantations, Inc., will operate the plantation.

Goodyear's purchase brings the company's total plantation acreage to 74,400, with large plantations in Sumatra and Brazil and smaller ones in Costa Rica and the Philippines. During the six to seven-year period of tree maturation, the new plantation will experiment with interplanting of coffee, corn, rice, and other grains.

The Evolution of Automotive Finishes

PERFORMANCE requirements for automotive finishes are as severe as any met in the protective and decorative coatings industry. Probably no exterior finish is subjected to such widely varying and rigorous exposure conditions as that on average passenger cars.

No single step has been responsible for developments in the automotive coatings field in the last 35 years. Progress was evolutionary and each gradual forward step was brought about by a combination of factors: development of better coating resins, better pigments, newer techniques and more efficient equipment.

The development of synthetic binders about 30 years ago was the first major step in making better quality finishes attainable. Equally important was the discovery and development of new and vastly improved pigments whose properties, aside from their purely decorative values, contribute in an important way to the ultimate durability of the synthetic finish.

1900-1920—The Big Rub

During the early 1900s, early automobiles were literally buggies and manufacturers naturally used the same basic finishing techniques, equipment and paint as had the buggy builders. Black was the color most used.

Car painters dipped their brushes into drums of pigmented-black oleo-resinous varnish-based enamel, and as many as seven coats of this varnish-based enamel had to be applied over a period of time ranging up to 45 days. Drying time hinged upon slow oxidation of the unsaturated links in the drying oil components of the varnishes. After each coat dried, the entire body was hand rubbed.

1920-1925—Two Moves Forward

Two developments took place almost simultaneously in the twenties: utilization of the spray gun

By **V. W. GINSLER**

**Glendale Laboratory
Barrett Division
ALLIED CHEMICAL & DYE CORP.**

and the introduction on a commercial scale of nitrocellulose lacquers.

The first experimental paint gun had been built by Dr. Allen DeVilbiss in 1907, but it wasn't until 1911 that it completed its first full year as a standard item.

The spray gun really became popular with the general mass-production trend of the twenties—the advantages of spraying automobiles were so obvious that nothing but the absence of a good

spraying material had prevented its use at an earlier date. Ten years after a practical spray gun was developed, the automobile industry discovered a quick drying finish (nitrocellulose lacquer) and in 1923 the Oakland car (forerunner of the Pontiac) appeared with an all-lacquer body. Its new finish dried in less than an hour and converted automobile makers overnight.

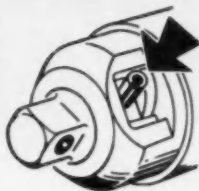
Unlike the older varnishes, the new lacquers air-dried through evaporation of their solvents (rather than by means of a chemical reaction or oxidation of oils). Brushing was now impractical because of the high volatility of the lacquers' ester and ketone solvents; the obnoxious odor of these

(Turn to page 115, please)

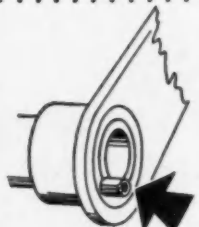
DEVELOPMENTS IN AUTOMOTIVE FINISHES

| PERIOD | DEVELOPMENT | CHARACTERISTICS |
|-----------|--|--|
| 1900-1923 | Oleo-resinous varnish-based enamels | Seven coats applied over 45-day period; slow oxidation of unsaturated links |
| 1923-1930 | Nitrocellulose lacquers—Spray gun utilized | Air-dried through evaporation of solvents; sprayed in eight to ten thin coats; finished in one day; wider range of colors; lacked hue and chroma; tended to fade, chalk, crack |
| 1930-1936 | Oil-modified Alkyd Resin | Utilized simple hydrocarbons; cured by oxidation; two-hour baking time; extended durability, greater toughness, wider possible color range, high gloss |
| 1936-1941 | Butylated urea-formaldehyde combined with alkyd resins | Superior gloss finish; hardness, adhesion, flexibility, durability; lighter colors |
| | Nitrocellulose lacquers combined with alkyd resin plasticizers | Less coats needed; no orange peel effect |
| 1945-1956 | Phthalocyanine blue and green pigments | |
| | Flake aluminum used for metallic sheen | |
| | Melamine-formaldehyde resin replaces urea | Improved resistance to water, moisture, weather |
| 1956 | Acrylic lacquer with phthalic ester plasticizer | Excellent color potentials, color retention, gloss and gloss retention; lacks some adhesion and flexibility |
| | Non-oxidizing alkyds for enamels based on coconut oil or synthetic unsaturated fatty acids blended with melamine | Overcame variances in color caused by baking cycle |
| Future | Improvements in acrylic lacquer and high melamine non-oxidizing alkyds | |
| | Research in polyurethane resins | Excellent adhesion, hardness, durability; chemical and corrosion resistance |
| | Epoxy resins | |
| | Silicone-alkyd resins | |

Rollpin® replaces 12 different fasteners



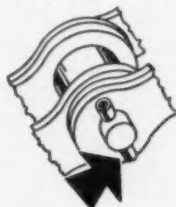
REPLACING A GROOVED PIN . . . in this application, Rollpin serves as a stop pin in a ratchet wrench adaptor. With its light weight and high shear strength, Rollpin functions perfectly . . . cuts assembly costs.



REPLACING A KEY . . . Rollpin demonstrates its ability to do away with precision tolerances, in this heating system damper arm. Faster, cheaper and more satisfactory than previous assemblies.



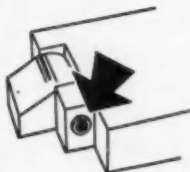
REPLACING A RIVET SHAFT . . . Rollpin serves as an axle for the sparkwheel of a cigarette lighter. No riveting or threading necessary . . . faster assembly. Note flush, clean fit.



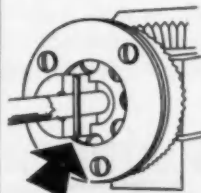
REPLACING A COTTER PIN . . . Rollpin assembly time is shorter, service life ten times longer. Vibration-proof flush fit. Easily removable.



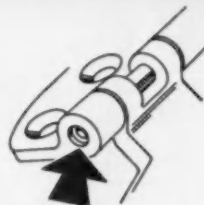
REPLACING A SET SCREW . . . to fasten automobile brake handle a short length Rollpin is self-retained in the hand grip but can easily be driven into over-drilled hole in shaft for simple handle removal.



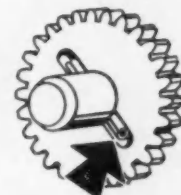
REPLACING A CLEVIS PIN . . . here Rollpin holds firmly in clevis, permits free action of moving member. Rollpin application shown is the plate of a home workshop tool.



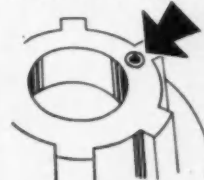
REPLACING TAPER PINS . . . in the assembly of precision differentials eliminated cost of taper pin reamers and the entire reaming operation. Rollpin costs less than a taper pin and installation is cheaper. They remove easily.



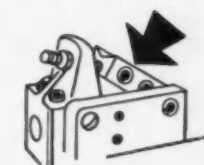
REPLACING A HEADED PIN . . . in this hinge pin application, Rollpin is simply and inexpensively driven in place, greatly reducing assembly costs. Constant spring tension holds Rollpin firmly in place . . . eliminates loosening of hinge due to wear.



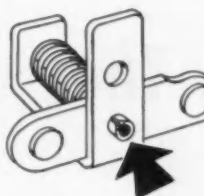
REPLACING A HUB ON A GEAR . . . Rollpin, self-retained in shaft, is simply snapped into molded slot to position sintered gear. This application, by an office equipment manufacturer, effects major savings in assembly. Rollpin's high shear strength is particularly valuable here.



REPLACING A DOWEL PIN . . . Rollpin is used here to prevent rotation of a thrust bearing. No reaming, no special locking. Easily removed. Lowest possible dowel pin cost.



REPLACING A BOLT AND NUT . . . Rollpins act as fasteners and pivots for the linkages in this electric welder. Rollpins may be used with a free fit in outer or inner members depending upon product design requirements.



REPLACING A RIVET . . . Rollpin serves as guide shaft for spring-loaded electrical interlock contacts. This electrical equipment manufacturer reports that rivet failure previously occurred at the clinched end under normal operating impact and vibration.

WHERE CAN YOU USE THIS SIMPLE FASTENER?



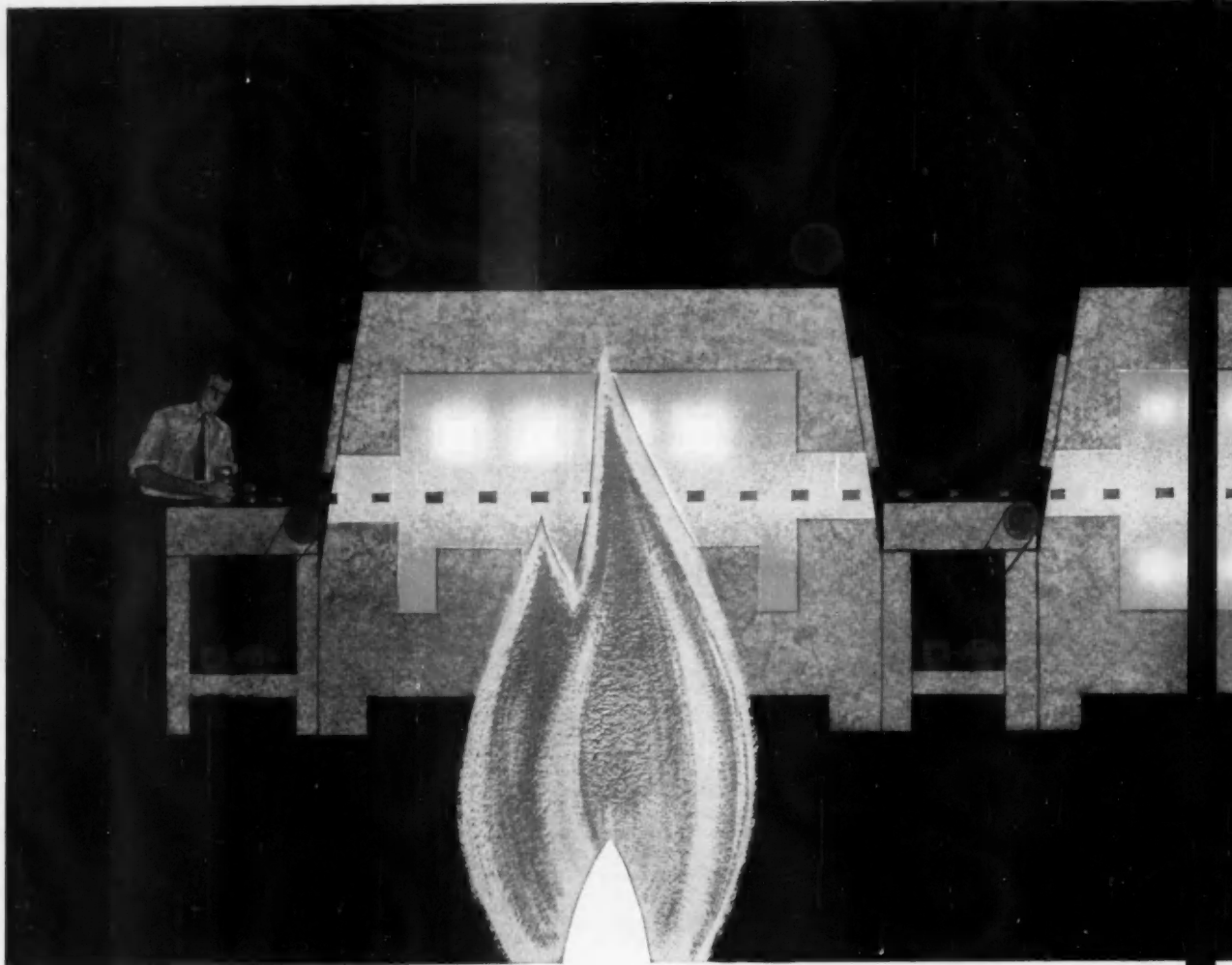
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Drives easily into standard holes, compressing as driven. Spring action locks it in place—regardless of impact loading, stress reversals or severe vibration. Rollpin is readily removable and can be re-used in the same hole. Made in carbon steel, stainless steel and beryllium copper. Write for samples and information, ELASTIC STOP NUT CORPORATION OF AMERICA, 2330 Vauxhall Road, Dept. R47-95, Union, New Jersey.

ELASTIC STOP NUT CORPORATION OF AMERICA

2330 VAUXHALL ROAD, UNION, NEW JERSEY

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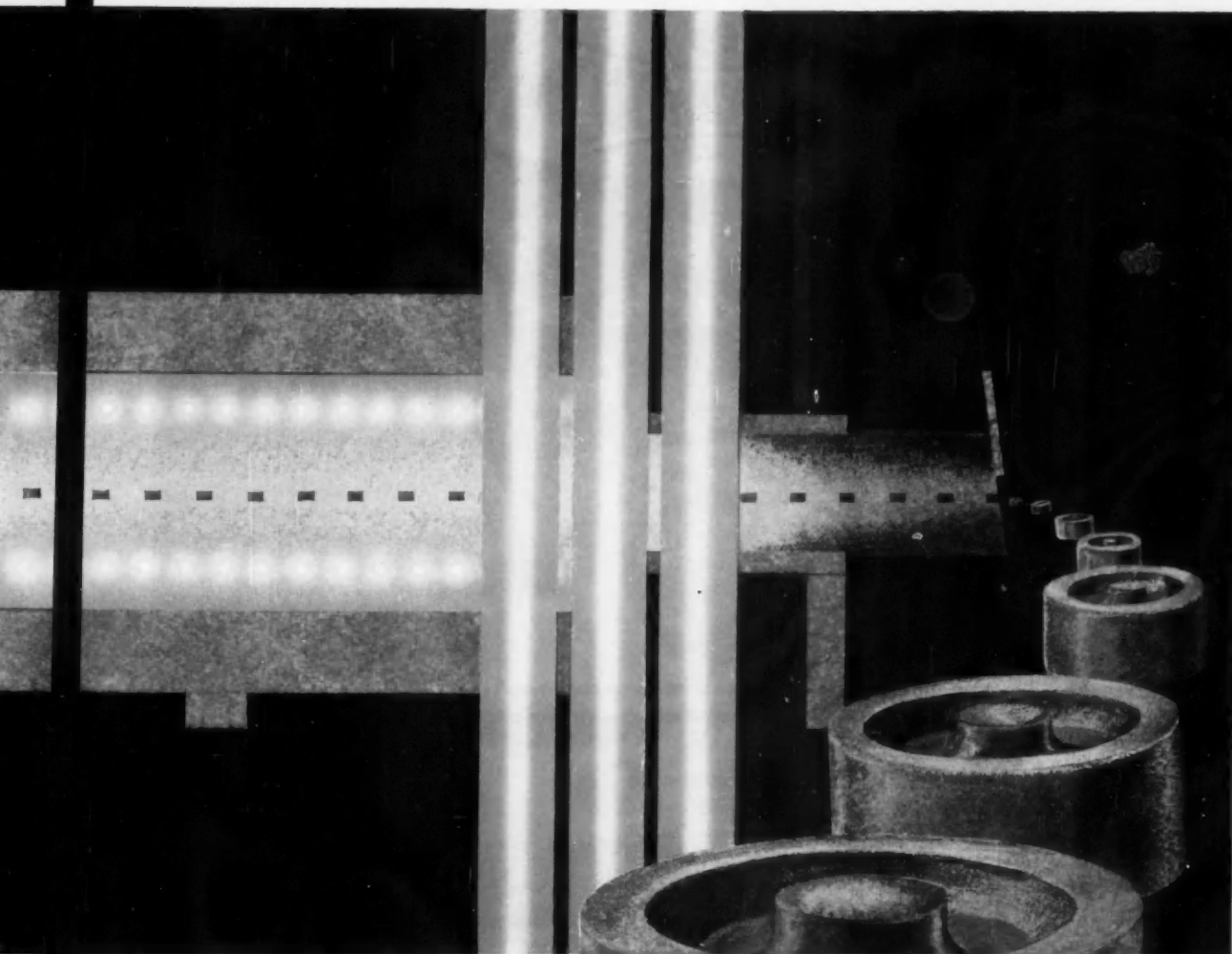
You may be adding extra labor to your costs if you haven't reviewed heat-treating maintenance. Over 40% of the furnaces in operation today are obsolete . . . at least 60% are over 20 years old. To keep production profitable, it makes sense to specify Westinghouse equipment—developed to keep heat-treating at lower cost.

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Call in your Westinghouse representative today or write Westinghouse Industrial Heating Division, Meadville, Pa. J-10464

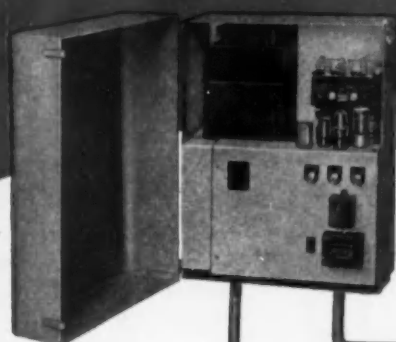


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Speeds are infinitely adjustable from 0 RPM to full output speed, and accurate speed regulation may be obtained from 100 RPM to full output speed.

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This modern boat trailer uses Youngstown Pipe for strong all-welded steel construction of its boat cradle and main trailer chassis.

YOUNGSTOWN CONTINUOUS WELD PIPE

... provides extra-strength chassis for
"Texan" boat trailers

Here's an unusual application for steel pipe. "Texan" Boat Trailers, produced by the Cunningham Trailer Works of Lubbock, Texas, are fabricated from Youngstown Pipe to provide users maximum cargo protection as well as greatest ease during loading, unloading and while making the haul.

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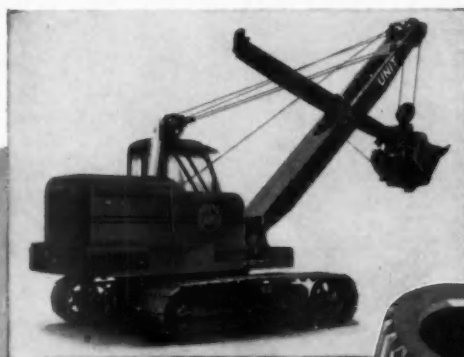
THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yaloy Steel

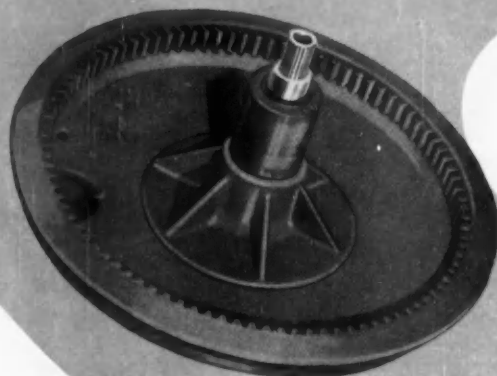
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Unit saves 2¼ man hours
on each shaft machined from



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Unit Crane & Shovel Corporation, Milwaukee, "lowered the boom" on costs by using OSTUCO tubing for vertical traction shafts in its line of heavy construction equipment. By eliminating a center-boring operation, Unit saved 2¼ hours machining time on each shaft.

OSTUCO tubing has tremendous strength to absorb the constant shock and strain to which Unit equipment is normally subjected and machines easily to precision tolerances.

Cash in on the economy of OSTUCO'S unique "Single-Source-Service"—complete tubing facilities "under one roof"—by contacting your nearest OSTUCO sales office.



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NEW

PRODUCTS

AUTOMOTIVE - AVIATION

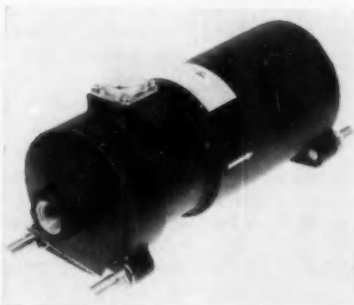
FOR ADDITIONAL INFORMATION, please use reply card on PAGE 89

Fuel Flow Transmitter

The new Pioneer-Central type 9152 fuel flow transmitter is an angular momentum type unit designed for use in true mass fuel flow measuring systems of single or multi-engine aircraft. It is used in conjunction with a remotely-located Autosyn type indicator to provide a highly accurate indication in pounds per hour of the rate of fuel flow. The device, unaffected by position or location of mounting, is adaptable to measurement of flows from rates of 50 to 6000 pph.

Working pressure is 1000 psi max. Weighing 7.5 lb, it operates on 115-v, 400 cycle, single phase current. Pioneer-Central Div., Bendix Aviation Corp.

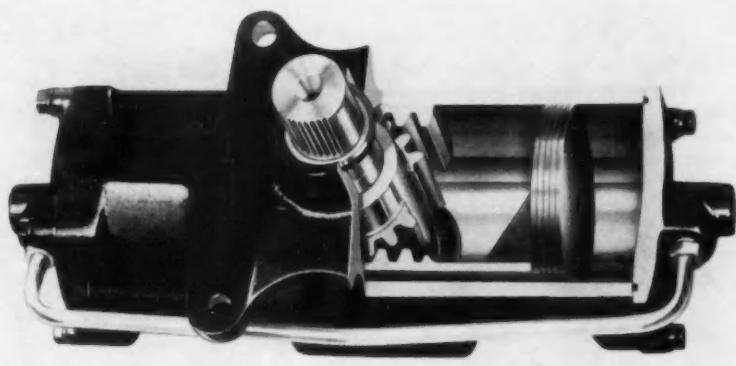
Circle 30 on postcard for more data



Acrylic Powder

A modified acrylic molding powder called Implex has been introduced. The new product was developed to provide greater toughness and impact strength, combined with the general stability characteristics of acrylics, at a price in the range of medium-cost molding materials. It is produced in white and a range of colors. The natural color of the plastic is off-white translucent. It contains no plasticizers and has low water absorption, the combination of which is said to result in excellent stain resistance. Rohm & Haas Co.

Circle 31 on postcard for more data



Thompson rotary motion power cylinder features versatility of application

Rotary Motion Power Cylinder

Versatile in application, a new rotary motion power cylinder, usable with hydraulic or pneumatic pressure, is now in production. Operating from 600 to 1000 psi, it is capable of delivering approximately 26,000 lb-in. torque at 700 psi.

Parameters can be varied to suit installations, and over-running clutches, gears, sprockets, etc. can also be adapted to the output shaft for added versatility. Michigan Div., Thompson Products, Inc.

Circle 32 on postcard for more data

Aircraft Filters

Six high-pressure high-temperature hydraulic filters for aircraft use that incorporate stainless steel wire mesh filter elements are in a line recently developed. Ranging in nominal capacity from 1.2 gpm to 29 gpm and adaptable to port tube sizes -4, -6, -8, -10, -12 and -16, the new filters can be made up with or without relief valves. Elements for use in housings without relief valves are of heavy duty construction and withstand a 4500 psi differential pressure. Elements for use with 100 psi relief valves will withstand a 300 psi differential pressure. The filters will remove all particles above 25 microns in size from hydraulic fluids and can handle fluids up to 400 F. Designs are available for filtering of fluids in the 400 to 600 F range.

Elements can be removed and cleaned by unscrewing the case without disturbing the piping connections.

Depending upon individual operating conditions, replacement or cleaning times can be based upon elapsed time



or service time, or upon a limiting pressure differential. A differential pressure indicator can be incorpo-

NEW PRODUCTS CONTINUED FROM PAGE 79

rated in assemblies which do not contain relief valves.

Housings and end caps for filter elements can be made of stainless steel or aluminum. The filters can be used with a variety of fluids by changing the packing material. They can also be used for fuel purposes when proper seals are inserted. *Purolator Products, Inc.*

Circle 33 on postcard for more data

Sealed Dipstick

Suitable for use with Diesel engines having low pressurized crankcases, a series of adjustable closures for the dipstick opening and oil filler port that give positive seals against entry of dirt are now being offered. Turning the closure handle expands the



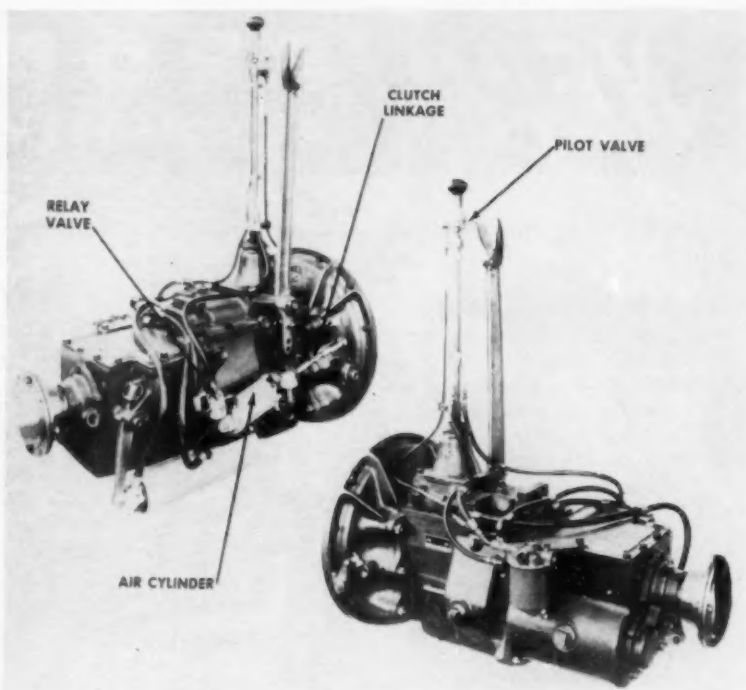
rubber washer to seal the opening. Turning in reverse loosens the seal for removal of the dipstick or oil filler plug. *Moeller Mfg. Co.*

Circle 34 on postcard for more data

Brake Cylinder Cups

High temperature resistant rubber compounds are now being used in the Wagner line of brake cylinder cups. The HTR parts are said to provide better sealings in high temperature service by design and resiliency which maintain maximum lip tension. They are also said to give optimum results without the need for cup expanders. Wheel cylinder boots are likewise now being made with the new HTR compounds. *Wagner Electric Corp.*

Circle 35 on postcard for more data



Automatic clutch operation is accomplished by the new Fuller Air-Power De-Clutch system for models R-46, R-96 and R-960 RoadRanger transmissions

Air-Power Clutch Operating System

The availability of a new Air-Power De-Clutch system for Fuller models R-46, R-96 and R-960 RoadRanger transmissions has been announced. Release and re-engagement of the clutch, as well as double clutching, is accomplished automatically when the vehicle is in forward motion, by moving the gearshift lever in the normal course of operation. The clutch pedal is still used when placing the vehicle into motion in either forward or reverse direction.

Operating from the vehicle air system at full line pressure, the system employs a pilot valve, relay valve, and air cylinder with interconnecting lines and linkage. The pilot valve, which incorporates the gearshift lever grip, includes an actuator which is hinged against spring tension to normally maintain the actuator in neutral or closed position. When the driver applies pressure to the grip to move the lever to the next gear ratio, the resistance in the gearshift lever to such movement causes the actuator to move slightly forward or backward against the spring tension. With the pilot and relay valves opened by this action, the air cylinder is energized and the clutch disengaged. As the

shift lever reaches neutral, resistance to movement is momentarily diminished, allowing spring tension to return the actuator and pilot valve to closed position. With this action the cylinder is exhausted and the clutch re-engaged. When resistance is again encountered as the lever moves from neutral on into the next gear ratio, the cycle repeats and concludes the double clutching operation. *Fuller Manufacturing Co.*

Circle 36 on postcard for more data

Aluminum Alloy

A new high strength alloy developed especially for welded aluminum structures which must operate at moderately elevated temperatures, has been introduced. Designated X5454, the alloy should find application in the process industries where aluminum vessels, storage tanks, tubes and piping are required to handle chemicals at elevated temperatures. Promising uses in the transportation industry include welded tank trailers that transport hot loads, such as asphalt, and welded dump
(Turn to page 157, please)

NEW

PRODUCTION and PLANT

EQUIPMENT

FOR ADDITIONAL INFORMATION, please use reply card on PAGE 89

Tensile Tester

FOR indicating bolt tension and calibrating impact wrenches, a new hydraulic tensile tester is being offered. This portable tool provides a means of checking bolts and fasteners for tensile strength against specifications. It is self-contained, and is equipped with a meter which reads pounds of tension.

The tester uses a hydraulic principle of operation. In use the threaded test piece is tightened in the tester with any wrench. Through hydraulic pressure the tension is transferred to the meter which has a direct-reading dial. The instrument may also be used in making calibration settings of impact wrenches. In this case, tests are made

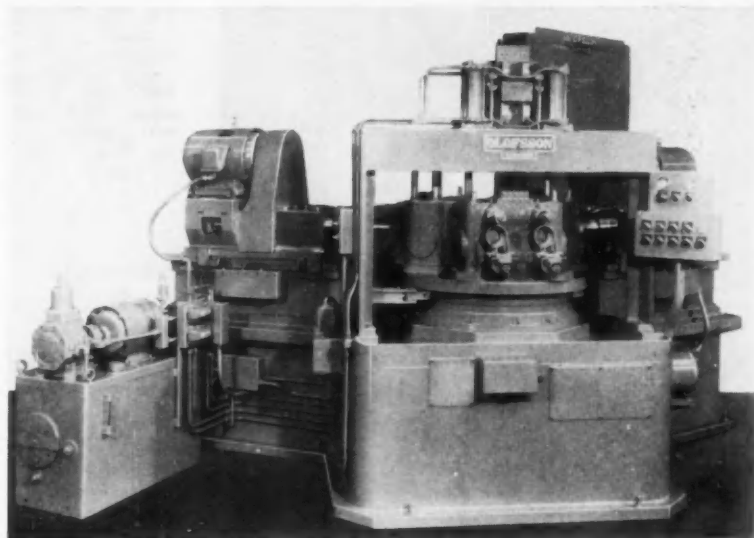


Skidmore-Wilhelm tensile tester

by tightening a bolt in the instrument with the impact wrench and reading the dial for tension.

Three models have gages for bolts from No. 10 to $\frac{1}{4}$ -in. long to $\frac{1}{2}$ by $1\frac{1}{4}$ -in. long; from $\frac{3}{8}$ by $2\frac{3}{4}$ -in. long to 1 by $2\frac{3}{4}$ -in. long; and from $\frac{1}{2}$ by $2\frac{3}{4}$ -in. long to $1\frac{1}{4}$ by 4-in. long. Accuracy over full scale reading is said to be within two per cent. Skidmore-Wilhelm Mfg. Co.

Circle 50 on postcard for more data



Olofsson three-station, two-way precision boring machine processes rear band servos at the rate of 220 pieces per hour at 100 per cent efficiency

Three-Station, Two-Way Boring Machine

IN performing multiple operations on automotive rear band servos, a new special precision boring machine produces 220 pieces per hour at 100 per cent efficiency. In operation, two parts are loaded on the machine, and the clamp start-cycle button is pressed. The machine then indexes to the next station where both parts are rough-bored, grooved, and the angle formed. At the third station,

parts are finish-bored to ± 0.0005 in. The entire operation is controlled from one pushbutton panel.

Features of the machine include hardened and ground steel V-ways, and hydraulic tank and controls located outside the base for easy accessibility. Hydraulic and electric circuits are to JIC standards. Olofsson Corp.

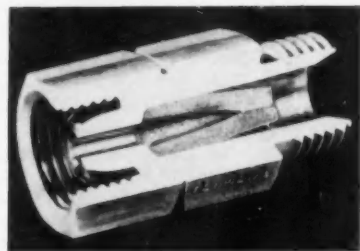
Circle 51 on postcard for more data

Torch Filter

USABLE with either liquid or gaseous fuels, a new design filter is said to be equally effective for welding, brazing or cutting torches. The Permetal No-Flash filter design prevents particles as small as 0.001-in. from entering the torch, and also helps to prevent flashback from passing through the filter to the hose lines.

The unit consists of an outer one-piece body and an inner one-piece core (filter) made of Permetal bronze. It is connected between torch and hose

line without adapters and with standard tools. Gibbs Ltd.



Permetal No-Flash torch filter

Circle 52 on postcard for more data

NEW PRODUCTION and PLANT EQUIPMENT



Automatic Transportation Company's new Elbolift industrial fork lift truck has no mast. Pictured is the unit's built-in retraction feature which improves stability during its 120-in. lift. It is the first of the company's MF series electric-driven trucks which have capacities ranging from 12,000 to 20,000 lb.

Novel Concept in Industrial Lift Trucks

NAMED Elbolift, a fork lift truck has been introduced that will lift 10 feet without a mast—said to be an entirely new concept of design and engineering in this field. Electrically-driven, it is the first of the company's MF series with lifting capacity ranging from 12,000 to 20,000 lb. By eliminating the mast assembly, a material weight saving and gain in driver visibility has resulted.

In order to obtain a straight up and down lift, compensating linkages are employed which permit loads to be taken from the ground and lifted vertically to a height of 120 in. To facilitate tiering, the truck offers a 10-deg back and 5-deg forward tilt. With only an 80-in. overall height, the 120-in. lift is claimed to be the highest ratio between lift and overall height of any industrial truck of this capacity.

Overall width of the truck is 48 in. It has two 16-in. wide tires. In addition to the wide tires, load stability has been improved by the introduction of a built-in load retraction feature and low slung position of the battery and counterweight. The driver is well protected on the sides by the counterweight and in the rear by a heel plate. The operator's platform is easily mounted from the rear.

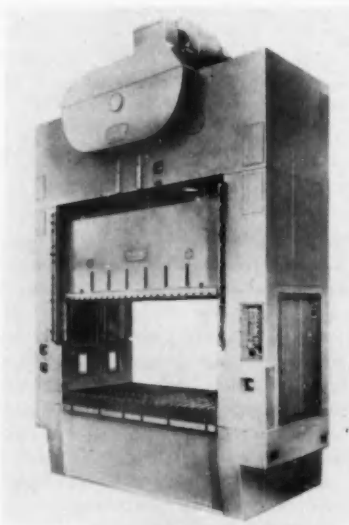
The truck is equipped with a silicone insulated Class H motor. Its four speeds, either forward or reverse, with foot inching to any preset or selected speed gives it close inching control. Manually adjustable forks are standard equipment, but hydraulically adjustable forks, side shifter,

and ram may be obtained as single or combination attachments for use in handling dies, pallets, platforms, and soils. Automatic Transportation Co.

Circle 53 on postcard for more data

Stamping Press

RECENTLY delivered to the stamping plant of a leading automobile manufacturer, a new 500-ton four-point eccentric press is being used to produce a variety of automotive stampings. Featuring a patented air-operated electrically-controlled drum type clutch, the unit has a 24-in.



Cleveland 500-ton four-point press

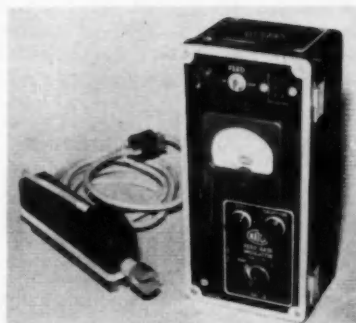
stroke and 15-in. adjustment. Shut height is 61½ in., and both bed and slide have an area of 72 by 144 in.

All gears and drive mechanism on the press are completely enclosed and spray-lubricated. An auxiliary air brake is provided for bringing the flywheel to a quick, positive stop. Cleveland Punch & Shear Works Co.

Circle 54 on postcard for more data

Feed Rate Indicator

To provide accurate, instantaneous readings, primarily for use in the setting of hydraulic feeds on machine tools, a new feed rate indicator has been developed. Indicator operation is effected by impressing a voltage across a linear potentiometer such that a motion of the movable contact creates a signal which varies with the rate of feed. This signal is then indicated by a meter calibrated in ipm. The indicator provides for



National electronic feed rate indicator

feed-rate changes of 0 to 10 and 0 to 50 ipm, with accuracy within ± 5 per cent. Other scales are available.

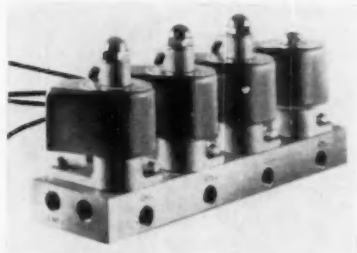
The device utilizes miniature vacuum tubes, and is powered by hearing aid batteries, with standard flashlight cells for tube filament power. Its cast aluminum case measures 6¼ by 9¼ by 4¼ in. The potentiometer operating rod is fitted with a permanent magnet which makes the pickup unit self-attaching to the movable member of the machine tool. This method of attachment also allows the rod magnet to pull free if the tool slide exceeds the potentiometer stroke length.

Setup time with the feed rate indicator is said to be cut to one-tenth the time formerly required when scale and stop-watch methods of measurement were used. National Automatic Tool Co., Inc.

Circle 55 on postcard for more data

Manifold Valves

THE availability of two and three-way solenoid valves for manifold mounting has been announced. Designed for this type of mounting, the ASCO midget size units permit the grouping of a number of solenoid valves on a common body, eliminating separate pipe connections to each valve. Any combination of two and three-way valves may be used when



ASCO manifold-mounted valves

operated from a common pressure and return line. Valve solenoids may be controlled individually or in any combination, depending upon service needs.

Valve bodies are of forged brass with crown type seats. Valve solenoids have stainless steel cores and soft composition disks for tight closure. Each valve can be quickly removed from the manifold body without disturbing other valves or pipe connections. Mounting position does not affect operation, and the valves are suitable for handling air, gas, water, oil, etc., up to a maximum temperature of 212 F. Pressure range is 0 to 300 psi. The three-way valves may be changed from normally-closed to normally-open operation or vice versa by revolving the body 180 deg. Automatic Switch Co.

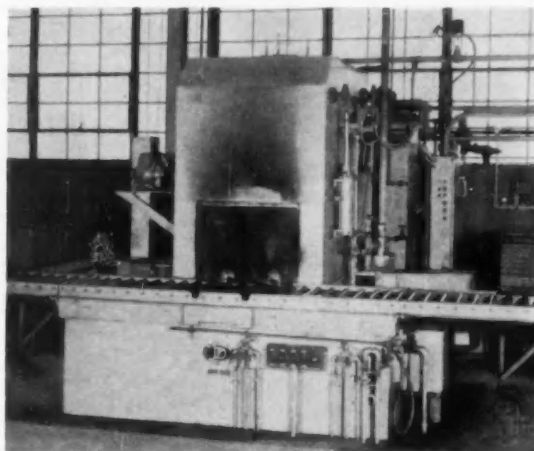
Circle 56 on postcard for more data

Midget-Sized Drill

ONLY five inches in length and weighing just 21 oz, a 3/16-in. pneumatic drill recently announced is said to be an ideal tool for close-quarter drilling of aluminum and other non-ferrous material. Distance from side of the drill to the center of the spindle is 11/16-in. Designated Model 300, it operates at speeds up to 5000 rpm, and is equipped with a Jacobs keyed chuck. The tool has a full-size pistol grip handle and trigger throttle. Airetool Mfg. Co.

Circle 57 on postcard for more data

Dow Model HD-1200 batch-type controlled-atmosphere heat-treat furnace has new design features which include an improved and enlarged quench tank, redesigned sealed and pressurized vestibule, and overall streamlining for easier maintenance.



Improved Design Controlled Atmosphere Furnace

NEW design and operational features have been announced by the Dow Furnace Co. in connection with their model HD-1200 batch type, controlled atmosphere, heat-treat furnace. The HD-1200, with a gross heating rate of 1200 lb per hour to 1500°F, has a temperature range of 1450 to 1700°F. It has a wide heat-treat process range including carburizing, carbonitriding, carbon restoration and clean hardening. New features include a completely redesigned sealed and pressurized vestibule; an improved and enlarged quench tank; a new safety door mounted inside the vestibule; and

overall streamlining for easier maintenance.

With these new features a full furnace load of four 14 by 22 by 18 in. work containers can be batch processed and quenched at one time. A loading section drops in place in front of the work chamber as the work enters the quench. This permits immediate reloading.

The entire outer structure has been streamlined by relocation of external mounted motors and other equipment so that maintenance is simplified and a saving in floor space is effected.

Circle 58 on postcard for more data

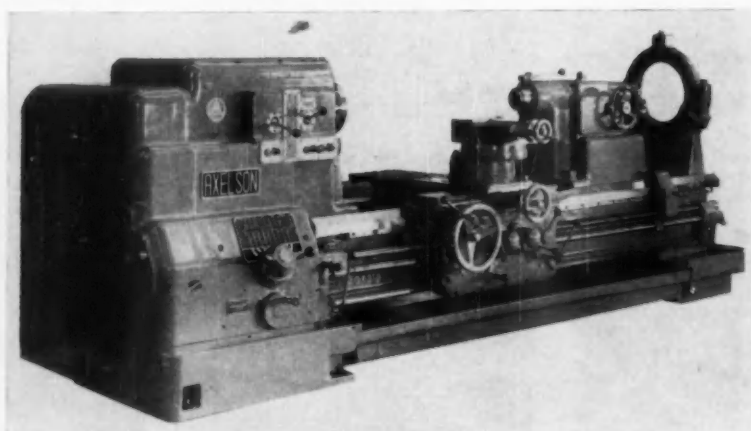
Grinding Machine for Helical and Spur Gears

Fellows-Reishauer No. 12 gear grinding machine can grind helical and spur gears up to 12 in. OD and 6 3/4 in. face width. Two lead screws are available, one covering from 6 to 48 and the other from 20 to 120 diametral pitch. Gear tooth shape is generated on the machine by an emery wheel on which a helix has been developed. The tooth section of the wheel is usually that of the basic involute rack. In operation, the involute is generated as the grinding wheel turns in unison with the work while the work passes axially across the wheel. (The Fellows Gear Shaper Co.)

Circle 59 on postcard for more data



NEW PRODUCTION and PLANT EQUIPMENT



New Lathe Added to Line of Machine Tools

The model 4431 lathe is a recent addition to the Axelson line of machine tools. Having swing over the ways of 44 in. and swing over the cross slide of 31 in., it is equipped with a 75 hp motor capable of developing over 100 hp for peak load needs. Headstock controls provide a range of spindle speeds from 7 to 650 rpm in geometric progression. The one-piece casting tailstock has a two-speed spindle, providing a rapid rate for setting the center and a slow movement for drilling, boring, etc. The totally-enclosed gearbox provides 61 feeds and 45 leads. Cast steel compound is capable of extended travel. (Axelson Mfg. Co.)

Circle 60 on postcard for more data

Automatic Pinch Jaw Chuck

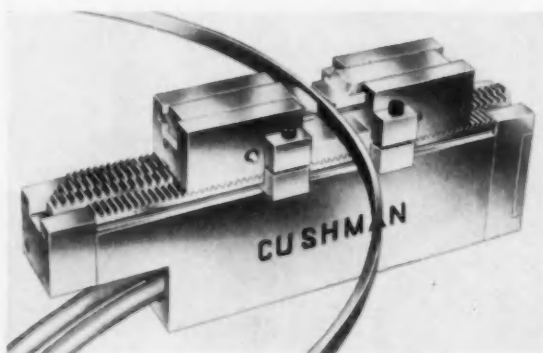
THE automatic pinch jaw chuck is a new workholding device which has just been designed. For use on vertical or horizontal spindle machines, it has been developed especially for chucking parts of large diameter and small cross-section without strain or distortion. Its construction is said to result in substantially reduced setup time and increased rate of production.

The chuck is comprised of a body with multiple jaw units and three self-centering master jaws. Each pinch jaw and the centering unit containing the master jaws are operated by self-contained reversible-type air motors, with valving and controls lo-

cated at the periphery of the chuck. In order to chuck a workpiece, the operator actuates one valve to center the part, another valve to operate one set of pinch jaw units, and a third valve to actuate the remaining pinch jaw unit.

Pinch jaw units are of the floating design, adjusting themselves automatically to the gripping surfaces of the workpiece. A maximum pinch of over 2000 lb at 85 psi is possible for each unit. A non-lift feature has been incorporated into the design; tests have shown that the amount of lift is held to less than 0.0002 in. per jaw. Cushman Chuck Co.

Circle 61 on postcard for more data



Illustrated is one of the new Cushman automatic pinch jaw chucks which provide a maximum pinch of over 2000 lb at 85 psi, with lift of less than 0.0002 in. per jaw. Air-operated, setup time is said to be substantially reduced.

Elevating Feeder

ADAPTABLE for feeding both rolling and sliding parts at preset speed, an elevating feeder designated special Model 2500 provides fully automatic



Feedall Model 2500 elevating feeder

parts flow from a barrel conveyor line into machines.

The unit illustrated handles piston pins in conveyor barrels, feeding them properly oriented and at any desired constant speed. Operation of the self-contained feeder is powered by a ½-hp, three-phase, 220/440-v motor with variable speed drive and electric brake. No hydraulic or air systems are required.

Angle of elevation, depth of conveyor cleats, and power takeoff location can be varied to suit varying needs. Feedall, Inc.

Circle 62 on postcard for more data

Industrial Solvent

SPECIALLY designed for use with ultrasonic cleaning equipment, a new industrial solvent is said to offer selective solvency, electrical stability, rapid drying, safety and low unit cost. Called Sonic-Solve 113, it will remove contaminants without affecting plastics, decals, magnet wire, insulating varnishes, etc.

The non-ionic, non-hygroscopic liquid is stable and safe for use with electronic cleaning equipment, it is claimed. After 10 seconds in an ultrasonic cleaner using the material, assembled open relays are devoid of rosin fluxes, oils, greases and dirt. Sonic-Solve is rapid drying, and no rinsing or neutralizing is necessary. London Chemical Co.

Circle 63 on postcard for more data

Milling Machine

ADDITION of a new and larger model to the Barker line of milling machines has been announced. Called the Model A-M, it takes No. 30MM standard adapters and will accommodate most standard indexing heads, vises and accessories. Head travel is



Barker Model A-M milling machine

6 in., table travel 10 in., and saddle travel 4½ in. Micrometer feed screws can be installed on any travel at slight extra cost. Spindle is mounted on Timken bearings. Drive motor is heavy-duty ¾-hp, ball bearing, totally enclosed. Coolant system is available at extra cost. *Barker Engineering Co.*

Circle 64 on postcard for more data

Pump and Motor Units

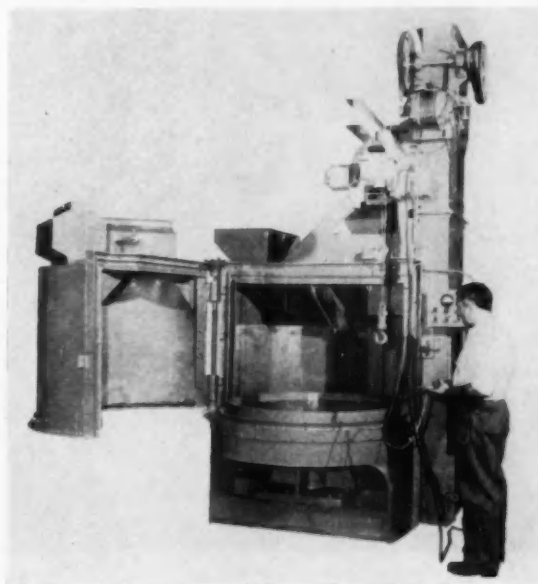
POSITIVE DISPLACEMENT pump-and-driving-motor units in a new series have been introduced for singular plant applications which do not war-



Tuthill pump and motor combination

rant custom design. They can be used in varying combinations for hydrau-

Pangborn four-foot Rotoblast table room, designed for a wide range of cleaning operations, handles parts up to 48-in. diam by 24-in. high and loads weighing up to 4000 lb



Smaller Rotoblast Cleaning Table Introduced

FOR cleaning various types of work that require a small, flexible machine for a wide range of cleaning operations, a four-foot Rotoblast table room has been developed. Castings, forgings and stampings up to 48-in. diam by 24-in. high, as well as plastic and composition materials, can be handled in this unit.

Capable of Rotoblasting loads weighing up to 4000 lb, this new table is equipped with a cast labyrinth abrasive sealing system which makes the cabinet abrasive tight without rubber gaskets. For efficient loading,

a single door opens to expose half of the 48-in. diam rotating work table.

A single overhead Rotoblast wheel, powered by a 10-hp motor, will throw 15,000 lb of abrasive per hour, and for extra cleaning capacity an optional 15-hp motor is available that will throw 22,000 lb of abrasive per hour. For maximum abrasive efficiency, a self-contained automatic elevator and separator continuously clean used abrasive for recirculation to the Rotoblast wheel. *Pangborn Corp.*

Circle 66 on postcard for more data

lic, oil burning, lubricating and other services involving several different fluids. The pump is mounted on the motor, eliminating the need for coupling, adapter or base and providing savings in space and weight.

The rotary positive-displacement pumps used in the units range in flow capacity from 20 to 300 gph and in pressures up to 1500 psi. Combinations include ¼-hp motors and larger. *Tuthill Pump Co.*

Circle 65 on postcard for more data

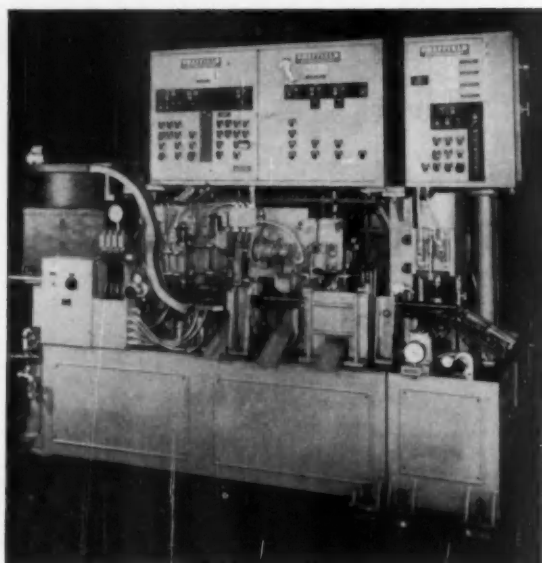
Air-Powered Drivers

PNEUMATIC screw drivers and nut setters in a new series have been announced. Powered by the newly de-

signed Keller Tool No. 2 air motor, the 12A-2 series screw drivers and 16A-2 series nut setters have a complete speed and torque range—from high speed low torque, to high torque low speed. Light weight is teamed with added power obtained through improved air intake and exhaust, in a body diameter of only 1½ in.

The new air tools also feature interchangeable gears, spindles and chucks, one-shot lubrication with flush-type fitting, and capacities up to 5/16-in. A choice of straight drive, positive and cushion clutches, with holders for ¼ and 7/16-in. hex socket drives, and the new Safe-Torque clutch makes the tools versatile in application. *Gardner-Denver Co.*

Circle 67 on postcard for more data



Sheffield automatic taper roller bearing machine automatically gages inner race, selects number of rolls, assembles bearing, and then checks assembly for torque, stand-out and noise level, segregating as acceptable or reject

Gaging and Assembly Machines for Bearings

FULLY and semi-automated gaging and assembly machines for various types and sizes of bearings are now being offered in a line. Supplementing the company's standard line of bearing air gages, they have been developed to meet increasing requirements for automatic dimensional quality control in all phases of precision bearing manufacture.

Illustrated is the new Sheffield automatic taper roller bearing assembly machine that automatically gages the diameter and flange thickness of the inner race, selects the proper number of rolls from one of six preselected

size hoppers, and automatically assembles race, rollers and cage into a bearing of predetermined tolerance. The bearing is then checked for torque, stand-out and noise level, and segregated as acceptable or reject.

A new automatic radial play gage that has an inspection rate of 1200 parts per hour has also been developed. Equipped with adjustable tooling, the Chekmatic covers a wide range of bearing sizes and automatically segregates selects and rejects on the basis of radial play measurement. *The Sheffield Corp.*

Circle 68 on postcard for more data

Machine Visers

TWO new Hylo precision machine visers, incorporating two-speed closing and gripping traverse and with open-jaw capacities up to 12 by 12½ in., have been announced. Utilizing two threads of different pitch on the same shaft, a single revolution of the handle will open or close the jaws at the high speed traverse rate of ½-in. per revolution. The low speed traverse rate of only 0.1-in. per revolution is engaged when the jaws contact the workpiece, increasing the gripping torque.

Five sizes, with open-jaw capacities ranging from 2 to 12½ in., are available in the line. A twin-jaw heavy-duty model features two-speed traverse in each of the two jaws, and

combines low mounting height with 12¼ in. capacity for large milling, shaping and planing operations. The two independent jaws facilitate the holding of workpieces with unequal lengths or widths. *Redbow Precision Tool Co.*

Circle 69 on postcard for more data

Fork Lift Truck

ADDITION of a highly-maneuverable pneumatic-tired 2000-lb model to a line of fork lift trucks has been announced. Designated Model FGF-20, it has a turning radius of only 71 in., and turns into a minimum intersecting aisle 65-in. wide. Overall length, without forks is 72¼ in., width is

35½ in., and standard lift height is 130 in.

Features for operator convenience include automotive type steering and controls, and absence of cowl for maximum visibility. Features for ease of maintenance include self-adjusting brakes, split-bell clutch housing, and



Baker FGF-20 pneumatic-tired 2000-lb gas fork lift truck

wide-angle engine compartment opening.

Equipped with a 29-hp engine, travel speed is 11.2 mph and drawbar pull with rated load is 1500 lb. *Baker-Raulang Co.*

Circle 70 on postcard for more data

Automatic Turret Lathe

BUILT for high-speed production of heavy components, a new automatic turret lathe has a 40-in. swing over ways, chuck sizes to 30 in. and a 50-hp motor. Known as the Model 8-U, it is intermediate in size between the company's present 6DREL and 10-U models. The machine has been introduced, it is said, in response to requests for a large heavy-duty turret lathe with speed and power to remove tough alloys fast and with the capacity and rigidity needed to produce large, heavy components quickly and economically on a fully-automatic cycle basis.

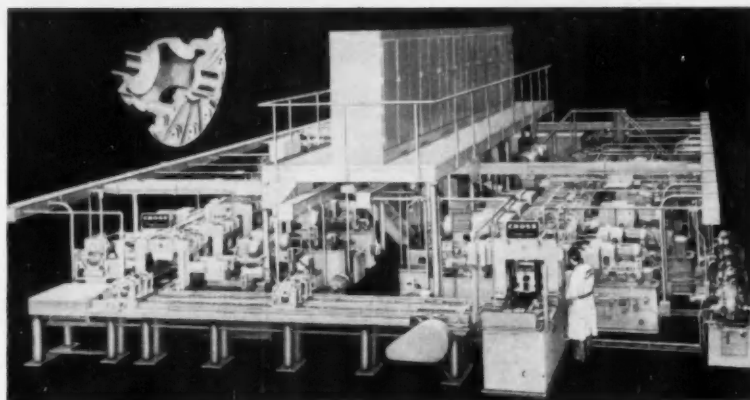
There is a wide range of speeds and feeds, with four automatic speed changes and three automatic feed changes for each set of pick-off gears. All slide and spindle motions are controlled from a centralized pushbutton panel. *Potter & Johnston Co.*

Circle 71 on postcard for more data

Transfer Machine Provides Inspection As Well As Machining Stations

S AID to be the first of its kind in the industry, a new Transfer-matic has been developed for machining one-piece rear axle differential gear cases. Work performed includes difficult operations on the inside of the part which were formerly handled on single-station machines. Machining two parts at a time, the 30-station machine rough and finish forms the two spherical seats for the pinions; rough and finish bores and faces the two seats for the side gears; drills, bores and reams the pinion shaft hole; drills and reams the lock pin hole; and drills, chamfers, spotfaces and reams 12 ring gear mounting holes. After machining, side gear pockets are inspected in station 8; stations 14 and 15 are set aside for visual inspection of operations to that point; and spherical seats are gaged in station 26. Rated capacity of the machine is 212 pieces per hour at 100 per cent efficiency.

The gear cases are transferred through the machine on pallet-type workholding fixtures. Part location in the pallet fixtures is from the ring gear seat and one of the two end bearing diameters, which are turned and ground in previous operations. The machine features a unique system for transferring, locating and clamping the pallet fixtures. Movement from station to station is ac-



New Cross Transfer-matic makes it possible, for reportedly the first time, to machine and inspect one-piece rear axle differential gear cases on transfer-type equipment.

complished with two reciprocating transfer bars. At the forward end of the transfer stroke, elevators lift the pallets from the transfer bars into engagement with fixed locating pins and rest buttons, which are attached to overhead bridge structures. Wedges then backup the elevators to secure the pallet fixtures in final position.

In stations where internal boring and facing operations are performed, the overhead bridges also carry the cutters. As the pallets are elevated to the clamped position, the cutters enter the part through the casting window, and thus find their correct location

relative to the gear case. After the cutting operations are completed, the elevators lower the pallets back onto the transfer bars which carry them to succeeding stations.

Transfer and indexing errors are minimized because the locating pins are positively fixed and do not move. Side gear and pinion locations are maintained in close relationship since the parts are not relocated and clamped between operations; thus improved quality is one of the advantages of the new machine over older methods. *The Cross Co.*

Circle 72 on postcard for more data

Standard High-Speed Roll Feeds Feature Accuracy

I NTRODUCTION has been made of a line of standard high-speed roll feeds indexed with a roller gear drive to provide repetitive accuracy at rates up to 1000 spm. The cam indexing method features positive feeding action without frictional braking, to

eliminate a source of inconsistent feeding. Rolls are connected by helical gearing.

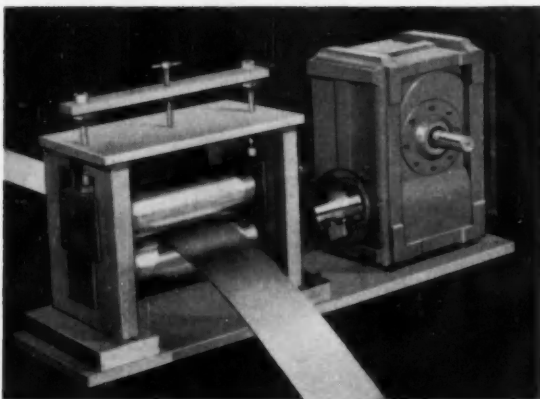
The Ferguson roller gear drive consists of a precision cut, hardened and ground tool steel cam with a tapered rib and a hub with ball or

roller bearing followers. As the cam rotates, a curvature in the rib causes the hub to move one increment, resulting in a partial revolution of the rolls to feed the stock into the die. During the working or dwell time the followers are engaged and locked with zero backlash by a straight portion of the cam rib. Since the mechanism utilizes a modified trapezoid acceleration characteristic, the starting and stopping action is smooth.

The indexing mechanism maintains an accuracy of 0.002 in. or greater, feeding some kinds of materials at operating speeds as high as 500 spm without auxiliary locating methods.

Standard units are available with strokes between one-inch or less to 10 in. and rolls up to 12-in. wide. A feed time of either 180 or 270 deg may be chosen with from 2 to 16 stops per one revolution of the rolls. *Ferguson Machine Corp. of Indiana.*

Circle 73 on postcard for more data



Ferguson standard cam indexed roll feed features repetitive accuracy at speeds up to 1000 spm. Units are available with strokes between one-inch or less to 10 in., and rolls up to 12 in. wide.

BULLETIN BOARD

TO THE ENGINEERING STAFF:

How many of these facts do you know about the new
SEALED POWER STAINLESS STEEL OIL RING

- ☐ It holds full tension at engine operating temperature.
- ☐ It's highly resistant to corrosion.
- ☐ It actually gets harder in use.
- ☐ It's side-sealing because of axial pressure of expander.
- ☐ Ring tension is derived independent of piston groove depth.
- ☐ Radial pressure against cylinder wall guarantees maximum oil control.
- ☐ Chrome-faced side rails double normal ring life.
- ☐ Easy assembly
- ☐ It's now being used exclusively by a million-car-a-year manufacturer.

The Sealed Power engineers will be happy to give you the complete story about this amazing SS-50U Stainless Steel Oil Ring. They've got all the facts and figures, including performance data in cars of one of America's largest builders.

LOST...
A pair of prescription-ground sun glasses; at the 19th Hole, Lakeview Club, last Saturday. A reward for the finder at the clubhouse.
Tom Curtis

THE FIRST Stainless Steel OIL RING

Does things no other piston ring can do!

Sealed Power Corporation
MUSKEGON, MICHIGAN



SS-50U

U. S. Patent
No. 2,789,872

Free INFORMATION SERVICE

Use either of these postcards for Free Literature listed below, or for more information on New Production Equipment and New Products described in this issue.

USE THIS POSTCARD

FREE LITERATURE

Burners

Superheat burners which use only fuel gas and air in flame hardening, brazing and soldering, spot-heating, flash cleaning, preheating and other applications, are discussed in nine-page bulletin S-1054. Selection data is included. *Selas Corp. of America.*

Batch-Type Furnaces

Six-page bulletin SC-1 describes a series of sealed cycle, controlled atmosphere furnaces for production heat treating of gears and other parts requiring closely regulated processing and distortion controlled quenching. *Dow Furnace Co.*

Milling Cutters

Specifications for 49 types of solid high-speed steel milling cutters, designed for machining aluminum, light metal alloys and ferrous materials, are contained in 32-page catalog HSS-1. *Goddard & Goddard Co.*

Gap Presses

Detailed specifications of mechanical gap presses in capacities of from 75 to 500 tons are contained in Catalog GP-57, 16 pages. *Verson Allsteel Press Co.*

Blind Rivet

Catalog 8-388, 14 pages, contains application data on the Huck CKL blind rivet, approved for aircraft construction. *Huck Manufacturing Co.*

Marking Machines

Catalog 14, 72 pages, presents pictorial stories of how manufacturers in various fields are using marking equipment to advantage. It also contains application reference material. *Geo. T. Schmidt, Inc.*

Optical Tooling

The design and application of optical tooling are featured in a new 56-page manual. Illustrations show the instruments and accessories, as well as the optical principles used in applying the equipment. *Keuffel & Esser Co.*

Heating Elements

Heating element design data for Chromel-A, an 80-20 nickel-chromium resistance alloy, are contained in 20-page publication M-57A. *Hoskins Mfg. Co.*

Heavy-Duty Cranes

Heavy double girder overhead cranes are described in new 12-page catalog HD-1000 issued by *Industrial Crane & Hoist.*

Quick-Change Tools

Catalog 57, 60 pages, gives detailed information on a line of quick-change tools which includes holders, adaptors, boring heads, arbors, milling cutters, and spacing collars. *Beaver Tool and Engineering Corp.*

(Please turn page)

9/15/57

VOID After Nov. 15, 1957

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| 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 |
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Engine Hour Meters 11

Instruments for recording running time of engine-powered stationary equipment and machine tools are described in 12-page catalog 600. *John W. Hobbs Corp.*

Press Clutch, Brake 12

Bulletin 37-A, four pages, illustrates and explains the features of a pneumatic friction clutch and brake unit for presses. *E. W. Bliss Co.*

Wire Cloth 13

Industrial wire cloth, screening and wire cloth products are covered in detail in 94-page booklet. *Cambridge Wire Cloth Co.*

Dust Collector 14

The Type W Roto-Clone, a dynamic precipitator with added water-spray feature, is described in 16-page bulletin 274B which includes performance and application data. *American Air Filter Co., Inc.*

Ceramic Magnets 15

Design data on high coercive force permanent magnets molded from low-cost ceramic powders, usable in various mechanical, electrical and electronic applications, is available in bulletin RC-11A, 12 pages. *Stackpole Carbon Co.*

Anti-Friction Bearings 16

Engineering manual lists ball and roller bearings of various types. Selection of ball thrust bearings, how to calculate capacities, and formulas for gear drives are some of the items discussed in Edition 15, 88 pages. *Aetna Ball & Roller Bearing Co.*

Stainless Steel 17

Physical properties, applications and other characteristics of Micro-Rold 430, a general utility straight chromium stainless steel, are given in a 28-page booklet prepared by *Washington Steel Corp.*

Microsize Nuts 18

Miniature self-locking nuts and clinch nuts, ranging from No. 0 to 4 diam and available in steel, stainless steel, brass and aluminum, are covered in four-page leaflet 2249. *Standard Pressed Steel Co.*

Dry Fluid Drives 19

Larger Flexidyne dry fluid drives and couplings, for use with motors rated up to 75 hp at 1750 rpm, were recently introduced and are fully described in bulletin A654, four pages. *Dodge Manufacturing Corp.*

Induction Heaters 20

Electronic induction heaters with output ratings of 15, 30, and 40 kw are covered in bulletin EH57-6, eight pages. A guide to induction brazing and soldering, frequency selector chart, static hardening curve, and other data are included. *Magnethermic Corp.*

Stampings, Forgings 21

Facilities for the production of forgings and deep drawn stampings, including services offered customers having demands for new parts, techniques, and materials, are presented in a 20-page booklet. *Transue & Williams Steel Forging Corp.*

Diamond Wheels

New American Standard identification code for diamond wheel shapes, B-74.1-1957, 14 pages, is now available. Request on company letterhead from the *Grinding Wheel Institute*, 2150 Keith Bldg., Cleveland 15, Ohio.

Research Facility

Information on a research and development facility is available in a 24-page booklet. Specific areas in which the facility is staffed and equipped are also listed. Address request on company letterhead to *Franklin Institute Laboratories*, 20th and Parkway, Philadelphia 3, Pa.

Area Survey

A large volume containing information on the availability of plant sites, transportation, shipping facilities, and other related conditions in the Chicago area has been published. Address request on company letterhead to the *Chicago & Eastern Illinois Railroad*, Chicago 4, Ill.

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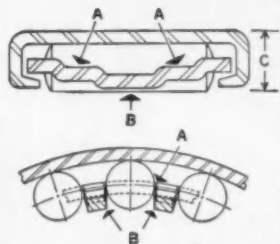
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**Features of the new
TORRINGTON DRAWN CUP
ROLLER BEARING**



- rollers end-guided at pitch line (A)
- shaft-riding retainer (B) designed to permit lubricant circulation
- high capacity in small cross section (C)
- long pregreased life
- efficient at high speeds
- mounted by press fit
- simple housing design
- low unit cost

INTRODUCING

a new low-cost precision roller bearing...

THE TORRINGTON DRAWN CUP ROLLER BEARING

For the first time, the advantages of drawn cup outer race construction are available in a precision roller bearing.

This compact, lightweight bearing consists of spherical end needle rollers, a one-piece hardened steel retainer and case-hardened thin-section outer race. Designed to run on a hardened shaft or with an inner race, this new series takes a press fit in a simple housing without snap-rings or shoulders.

Highly efficient roller guidance and lubrication are outstanding features. The shaft-riding retainer contacts the roller ends at the pitch line where guidance can be obtained with the least effort. The design provides ample storage for lubricant and promotes its circulation.

These features make the new bearing particularly suited to applications requiring compactness with precision, high-speed endurance or long pregreased life.

For information on sizes now available and for application assistance, call on our Engineering Department or write for the new bulletin, "Torrington Drawn Cup Roller Bearings." THE TORRINGTON COMPANY, Torrington, Conn. — and South Bend, Ind.

TORRINGTON BEARINGS

District Offices and Distributors in Principal Cities of United States and Canada

NEEDLE • SPHERICAL ROLLER • TAPERED ROLLER • CYLINDRICAL ROLLER • THRUST • BALL • NEEDLE ROLLERS

News of the MACHINERY INDUSTRIES

By Charles A. Weinert

**Special Mock-Up Unit
Provides Means of
Creating New Designs in
Electroplating Equipment
in Less Time Than Has Been
Required Heretofore**

TO meet the problem of rising engineering and manufacturing costs, Wagner Bros., Inc., of Detroit has developed a novel approach to the design of electroplating equipment. Out of this has emerged a new concept of equipment design, employing standardized elements and modular structural fabrication. These features, together with fresh design principles, stem from the special mock-up unit illustrated here. This structure, representing $1\frac{1}{2}$ modular repetitive sections of an automatic plating machine, is

used for development and testing of the various improvements in structure and operating functions.

The mock-up has been instrumental in the testing and acceptance of some radical design improvements. One of the most important is a new type of elevator mechanism fitting into the modular scheme. The mechanism is gear-driven and permits either transfer lift or horizontal index motion at any point in the span of the machine. The elevator permits spacing of elevator stations far enough apart to obtain an

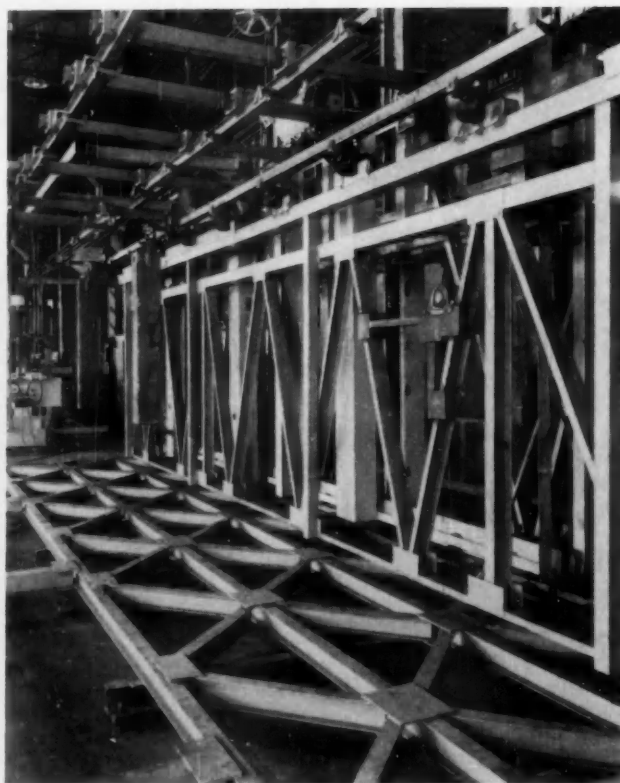
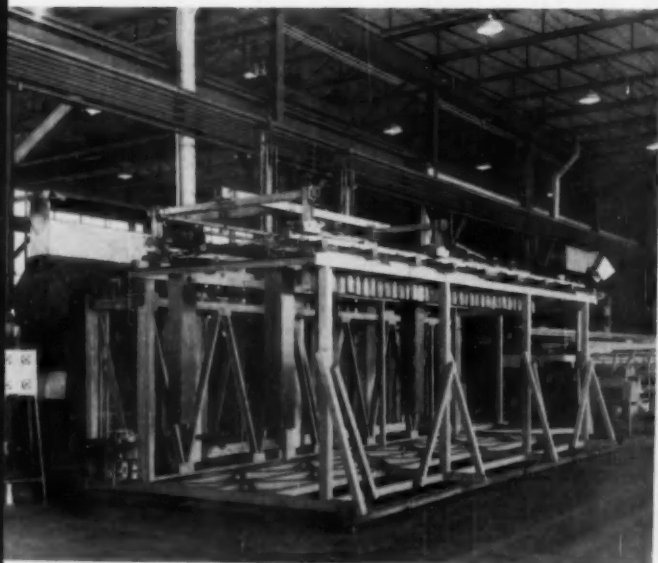
ideal repetitive pattern throughout the base, panels, and carriage assembly.

Another improvement is a friction clamping technique for joining structural members. The friction-clamp principle now is applied in attaching the cross arm which supports the lifting angle to the elevator boom, and on certain joints of the pusher assembly. This eliminates drilling or welding and makes replacement a simple matter.

Mock-up operation also resulted in the adoption of a special com-

*Perspective of the
Wagner mock-up
on which various
devices and im-
provements are
installed and
tested*

*Modular construction
is exemplified
by the repetitive
pattern in the
members of the
base unit, the
panels, and re-
ciprocating car-
riage mock-up*



compensating mechanism which makes possible close spacing of work racks within multiple-station tanks. This results in short machine length, and small volume of plating solutions. The compensating unit permits two-way adjustment of the length of the pusher assembly stroke. It can be adjusted to equal or exceed the length of the carriage or transfer stroke. Consequently, the thickness of the plating within any individual tank can be varied without affecting the overall machine cycle.

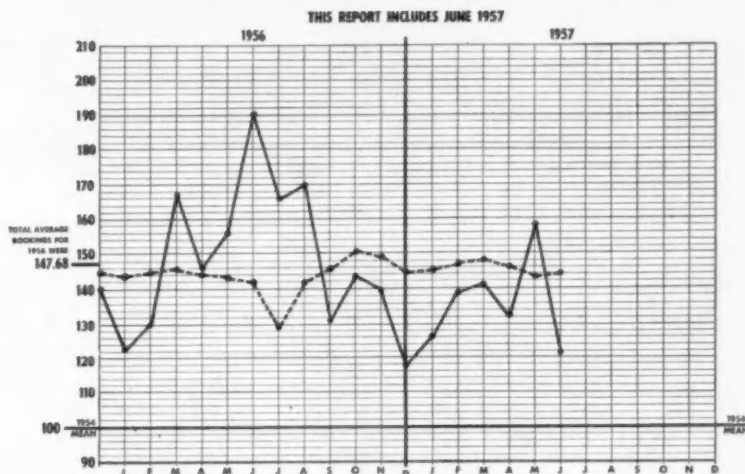
Another important feature proved out on the mock-up unit is an improved method for moving racks horizontally within each plating bath. The Wagner principle consists of an inverted wide-mouthed V-pusher lock mounted on the pusher arm I-beam, and a special carrier key attached to the rack carrier bar. This assures positive engagement between the pusher lock and carrier key, preventing misalignment during horizontal travel. In addition, the wide-mouthed V-form tends to relocate or center any carrier bar that may have come out of alignment accidentally. Since this design eliminates moving parts in the area directly over the baths, the problems of clogging are eliminated, as is the possibility of contaminating the solutions with lubricant.

These innovations make it possible for Wagner to create a new design quickly and translate it into a finished structure in considerably less time than has been required heretofore. The precision of this modular construction also contributes to greater accuracy and consequently requires less time for erection in the customer's plant.

Cincinnati Shaper Co. Forms British Subsidiary

The Cincinnati Shaper Co. has announced organization of The Cincinnati Shaper Co., Ltd., a subsidiary for the manufacture of metalworking machinery in Great Britain. David H. March, vice president of the parent company, is managing director of the British subsidiary.

MONTHLY BOOKINGS INDEX REPORTED BY THE MATERIAL HANDLING INSTITUTE, INC.



Solid line: Monthly Bookings furnished by The Material Handling Institute, Inc., from figures furnished by Association of Lift Truck and Portable Elevator Manufacturers, Caster and Floor Truck Manufacturers' Association, Conveyor Equipment Manufacturers' Association, The Industrial Truck Association, and Monorail Manufacturers' Association.

Dash line: Federal Reserve Industrial Production—1947-1948, seasonally unadjusted (preliminary).

Handling Equipment Sales Down, But Trending Upward

Dollar volume of orders received by material handling equipment manufacturers on the whole climbed during the first six months of 1957, as compared with a general downward trend during the last half of 1956. There was, however, a reduction in June, 1957 of 23.1 per cent from the May, 1957 sales figure. These trends are reflected in the monthly bookings index of The Material Han-

dling Instituté, Inc. as reproduced here.

The average dollar volume of 1957 monthly orders received through June is 136.43 as contrasted with 100, the monthly base average of 1954. Volume of first-half 1957 business represents 46.19 per cent of the total business received last year, and 68.21 per cent of the bookings in 1954, the statistical base year.

Gas Turbine Engine Weighs Only 50 Lb

Solar Aircraft Co. is designing and will produce a new variable-speed gas turbine engine for flying platforms under study by the Army. The engine will be an adaptation of the constant-speed YT-62—world's smallest gas turbine aircraft engine—designed by Solar for a one-man helicopter.

The engine's military designation is the YT-66. The company is developing both power plants under contract sponsored jointly by the Bureau of Aeronautics and the U. S. Army.

Until now, development of flying

platforms has been limited by the operating characteristics and heavy weight of piston engines, but the reliability and high power-to-weight ratio of gas turbines is expected to overcome this difficulty. The new YT-66, a free-power or variable-speed turbine, will also be adaptable for land propulsion and other non-airborne applications requiring variable-speed power. It will also be adaptable to one-man helicopters.

Both the variable-speed and constant-speed versions of the 55 hp engine will weigh only 50 lb and have a maximum diameter of 15½ in. Maximum height of the engine will be 22½ in.

AIR BRIEFS

By RALPH H. McCLARREN

PERSONAL AND EXECUTIVE AIRCRAFT SHIPMENTS

| Manufacturer | Aircraft Shipped | Manufacturers Net Billing Price |
|---------------|------------------|---------------------------------|
| Aero Design | | |
| Model 560A, E | 11 | \$ 6,003,000 |
| Model 680 | 70 | |
| Beech | | |
| Bonanza | 281 | |
| Model D18S | 3 | |
| Model E18S | 64 | \$17,574,000 |
| Twin Bonanza | 56 | |
| B-45 | 25 | |
| Call Air | | |
| Model A4 | 15 | \$ 90,000 |
| Cessna | | |
| 170B | 36 | |
| 172 | 413 | |
| 180 | 255 | \$14,940,000 |
| 182 | 483 | |
| 310 | 70 | |
| Champion | | |
| Model 7EC | 69 | \$ 492,000 |
| Model 7FC | 39 | |
| Mooney | | |
| Mark 20 | 41 | \$ 411,000 |
| Piper | | |
| Super Cub | 484 | |
| Tri Pacer | 637 | \$13,680,000 |
| Apache | 237 | |
| Taylorcraft | | |
| Model 20 | 6 | \$ 62,000 |
| TOTAL | 3,295 | \$53,252,000 |

Of the 513 planes shipped in June 1957, 426 were four-place or more and 87 were one- and two-place aircraft.

Personal and Executive Aircraft Shipments

During the first six months of 1957 utility aircraft shipments from eight manufacturers amounted to 3295 aircraft valued at \$53,252,000. According to figures released by the Utility Airplane Council of the Aircraft Industries Association, the shipments by manufacturers are as shown in the box above.

New Device Warns Pilot Of Approaching Planes

An infrared proximity warning indicator (PWI) designed to prevent midair collisions between aircraft has been developed by the Avionics Division of Aerojet-General Corp. The PWI detects the infrared energy (heat) given off by the engines of approaching planes and alerts the pilot in time to take any corrective action necessary to prevent a collision. A company sponsored test unit will soon be installed in an airplane for airborne evaluation. Airlines and the Air Transport Association are interested in the device. It has been indicated by Aerojet-General that use of the indicator would have given sufficient warning of impending disaster in about 80 per cent of the mid-air collisions analyzed by the Civil Aeronautics Administration.

More Comfort and Safety For Pilots

New light-weight flight gear that will give supersonic pilots greater safety, more mobility and increased comfort is being developed for the U. S. Air Force. It includes in one three-section flying suit the protection now embodied in five separate garments. Also helmets, gloves and flying boots have been redesigned to provide the best possible accessories for flying and for survival, should the pilot have to eject himself from the aircraft.

Working with the Air Force on personal gear developments are five aircraft companies including Convair-San Diego, Boeing Airplane Co., Convair-Fort Worth, Lockheed Aircraft Corp., North American Aviation, Inc., and Republic Aviation Corp.

\$50,000 Camera to Speed-Up Construction of Convair 880 Jet Airliner

One of the world's largest template cameras soon will be in operation at Convair (San Diego), a Division of General Dynamics Corp. It will be used in the reproduction of templates for building the Convair 880 fourjet airliner and will go into service in mid-August.

Built to Convair's specifications at a cost of \$50,000, the camera is the most expensive piece of photo equipment ever acquired by the company. The camera
(Turn to page 116, please)

you can meet any lubrication specification if you

BLEND WITH ENJAY PARANOX®

(DETERGENT-INHIBITOR ADDITIVES)

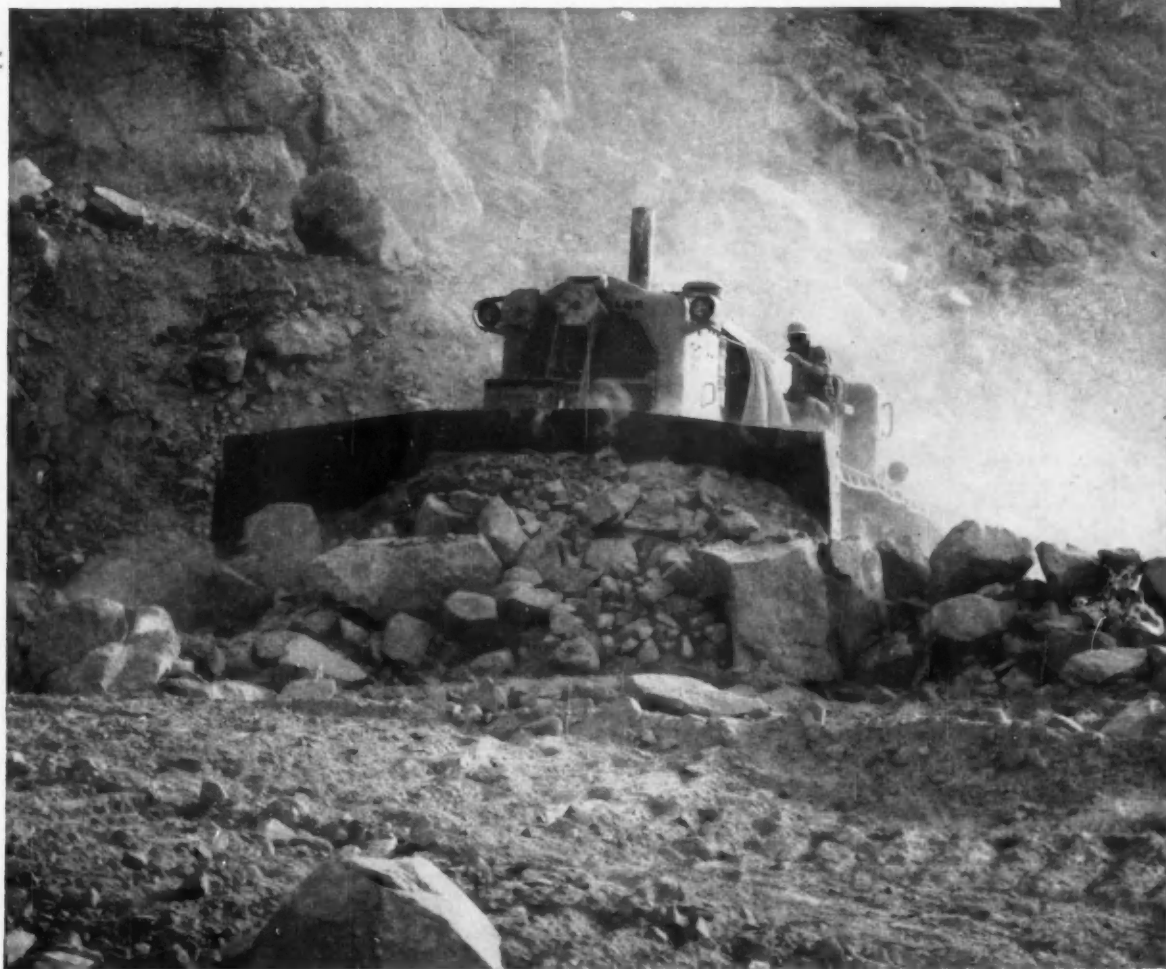
Blended with Paranox, lubricants can be compounded to combine *both* minimum wear and maximum engine cleanliness characteristics. That's why more and more refiners and blenders are relying *exclusively* on Paranox in formulating lubricants for heavy duty equipment and all engines that are subjected to tough operating conditions. Through years of intensive research and development work with manufacturers and oil companies, Enjay has developed the only *complete line* of high quality additives (Paramins®) that can assure *maximum* performance characteristics. Why not let this experience and know-how work for you? Contact the Enjay Company today.



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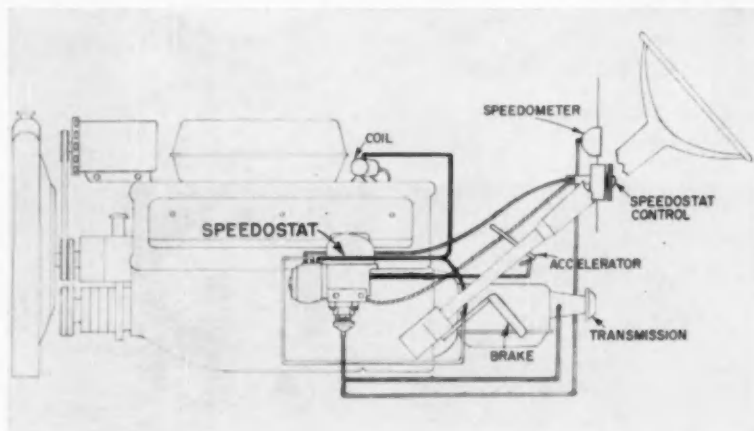
Akron • Boston • Chicago • Detroit • Los Angeles • New Orleans • Tulsa



New Device for Control of Vehicle Speed

Below is a schematic drawing showing how the Speedostat is connected to an automobile

At right—the Speedostat is shown installed at the left front of the engine



A NEW device that will control speed of an automobile at any preset rate, but at the same time will permit the driver to accelerate beyond the predetermined speed for a short time in special circumstances, has been developed by Perfect Circle Corp., Hagerstown, Ind. Called the Speedostat, it will be offered as optional equipment on a number of the 1958 cars, probably under names chosen by the motor manufacturers. It is available to any manufacturer on a non-exclusive basis.

In the new device, road speed (not engine speed) is controlled, and the driver may reset the controlling speed at any time while the car is at a standstill or in motion by a turn of a dial. Furthermore, the driver may at any time push through the barrier set by

pressing on the accelerator hard enough to overcome the resistance of a spring in the mechanism. Additionally, the long-distance driver on open roads may, by pushing a locking button on the control dial, keep the car at the speed set without need to hold down the accelerator pedal. A touch on the brake pedal unsets the device at any time.

The mechanism, an electromechanical unit, is driven by the transmission through a cable that replaces the speedometer cable, and the speedometer cable is run from the unit to the speedometer. When a desired speed is set on a selector dial, located on the instrument panel or the steering column, a cable from the dial sets a helical spring in the unit, mounted under the hood, to a calibrated position. This spring con-

trols a small flyball governor that opens and closes contacts energizing a small reversible 12-volt motor in the unit. The motor, running forward or backward according to the action of the governor, activates a rocker arm connected with the linkage to the accelerator and carburetor, controlling the throttle opening.

The car may be accelerated beyond the speed set on the selector dial by pushing on the accelerator hard enough to overcome the resistance of a spring having a 24-lb compression. There is no danger that this will be done unthinkingly, but it provides a means for temporarily accelerating beyond the set limit. As soon as the strong pressure on the accelerator is relaxed the carburetor control returns to the idle position, and the car can again be accelerated up to the set limit.

When the locking button is pressed on the selector dial, to hold the car automatically at a selected speed independently of the accelerator, a circuit is closed and an electromagnet is energized, pulling down a latch that couples the accelerator linkage and the governor linkage. This circuit is broken instantly when the brake pedal is touched, the latch is released, and the accelerator linkage is returned to the control of the driver.

The unit will probably sell for
(Turn to page 132, please)



STEEL TUBING TIPS:

HOW TUBING ENGINEERS CAN HELP YOU PLAN FOR VOLUME PRODUCTION SAVINGS!

GM Steel Tubing Engineers offer cost-saving fabrication advice at the design stage!

Designers of automotive, refrigeration and other products have found that GM Steel Tubing Engineers can offer many cost-saving tips *in the planning stage*.

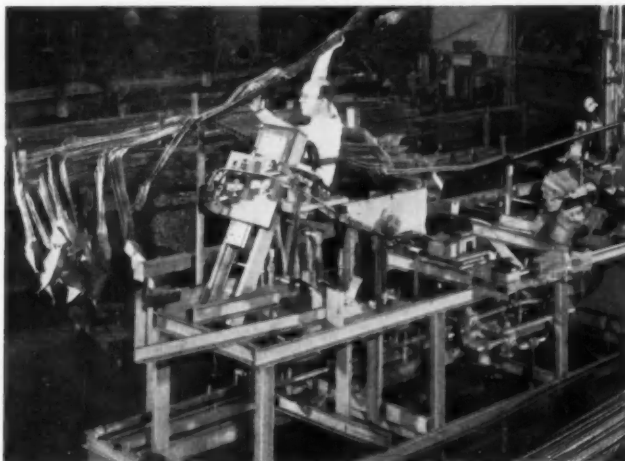
Industry standards are sometimes sufficient when designing a simple tubing application. But a review by the tubing engineer can often suggest changes which will effect greater economies in volume production.

For example, it is usually more economical to incorporate tubing of minimum thickness and diameter. However, the tubing engineer, with his knowledge of tubing manufacture, can tell you when a greater wall thickness or diameter will achieve greater economies.

And the tubing engineer's knowledge of fittings will help you at the planning stage. Based on operating conditions, he can recommend the fitting that will work best at the least cost. Keeping up with the latest tubing advances also makes it possible for him to show you how to take advantage of savings with tubing for fabricated parts and mechanical applications other than fluid or gas carriers.

The design of formed steel tubing connecting lines is another area where the tubing engineer can be of great help to the designer. Again, standards and rules may prove inadequate if you are to be absolutely sure of the most economical part to do the job. The tubing engineer can tell you how to get the greatest number of bends for the least cost, how tubing will react when formed by various methods to give you the most efficient design.

When designing any product requiring tubing, consult your GM Steel Tubing Sales Engineer *in the planning stage*. Or, for general information, write direct to: Tubing Sales Manager, Rochester Products Division of General Motors, Rochester, New York.



Hydraulic forming fixtures like these at Rochester Products can be adapted to handle your requirements at minimum tooling costs. GM Steel Tubing Engineers offer you an unequalled choice of fast, cost-cutting forming equipment, let you plan production savings in the preliminary design stage.



GM Steel Tubing gives you the design flexibility of lengths up to 2000 feet. Eliminate costly joints and elbows, effect additional savings by cutting end waste.

GM STEEL TUBING by



ROCHESTER PRODUCTS

The BUSINESS PULSE

Additions to Stockpiles of Inventories During Second Quarter of Year Has Lessened Likelihood of Significant Inventory Investment During Remaining Months of 1957. Uptrend in Consumer Expenditures for Goods Since March.

Businessmen and investors appear to have grown more cautious in their estimates of autumn prospects. The widely held earlier assumption that the economy would undergo a significant rise of more than seasonal proportions this fall seems to have given way to a feeling of doubt and uncertainty, and this apparently explains at least in part the notable decline in stock prices which occurred during August.

A number of factors have apparently contributed to the developing caution.

First, there have been increasing signs that the economy move in the Federal Government is about to bear fruit. Although Congress has not adjourned at this writing, action to date suggests that the total of appropriations voted during the session will be upward of \$4½ billion below President Eisenhower's January request. And the Administration itself has put renewed emphasis on efforts to check the rise in spending and to trim outlays wherever possible, the most dramatic aspect of this being the announcement recently of cutbacks in expenditures and employment by the Defense Department.

These economy efforts cast serious doubt on the frequently made assumption that Federal spending will continue to be a factor of expansion into the indefinite future. Instead, prospects are that increases in Government spending during the next few quarters will be small, if they occur at all. This contrasts sharply with the significant rise which has occurred in this area during the past year.

The revelation that businessmen

This Survey Is Prepared Exclusively for AUTOMOTIVE INDUSTRIES by the Guaranty Trust Company of New York.

in general added to their stockpiles of inventories during the second quarter of the year, instead of reducing them as had been anticipated, may also have been influential in dampening optimism. This development lessens the likelihood of significant inventory investment during the final months of this year, which, of course, would have been a temporary stimulating factor, since it means that businessmen will be at least partially able to supply any increased demand that may occur out of existing stocks, without scheduling higher production. And if statistical data, when they become available, indicate a continuation of inventory accumulation through the third quarter of the year, prospects for near-term stimulus from this sector will be even less promising.

Plant Outlay Tapering Off

Significantly, the doubts about the future course of inventory investment arise at a time when it appears that the other major category of business investment—plant and equipment outlay—is tapering off. There was virtually no change in this type of business expenditure from the first to the second quarter of this year, whereas sharp and uninterrupted gains occurred in the preceding eight quarterly periods. The rate of business outlay, for equipment and construction is

now running approximately 50 per cent above that in the first quarter of 1955, and in view of this tremendous rise it seems reasonable that spending should moderate, particularly since there are numerous present instances of productive capacity exceeding demand. Actually, the pertinent question is whether some decline in this type of spending should not now be expected.

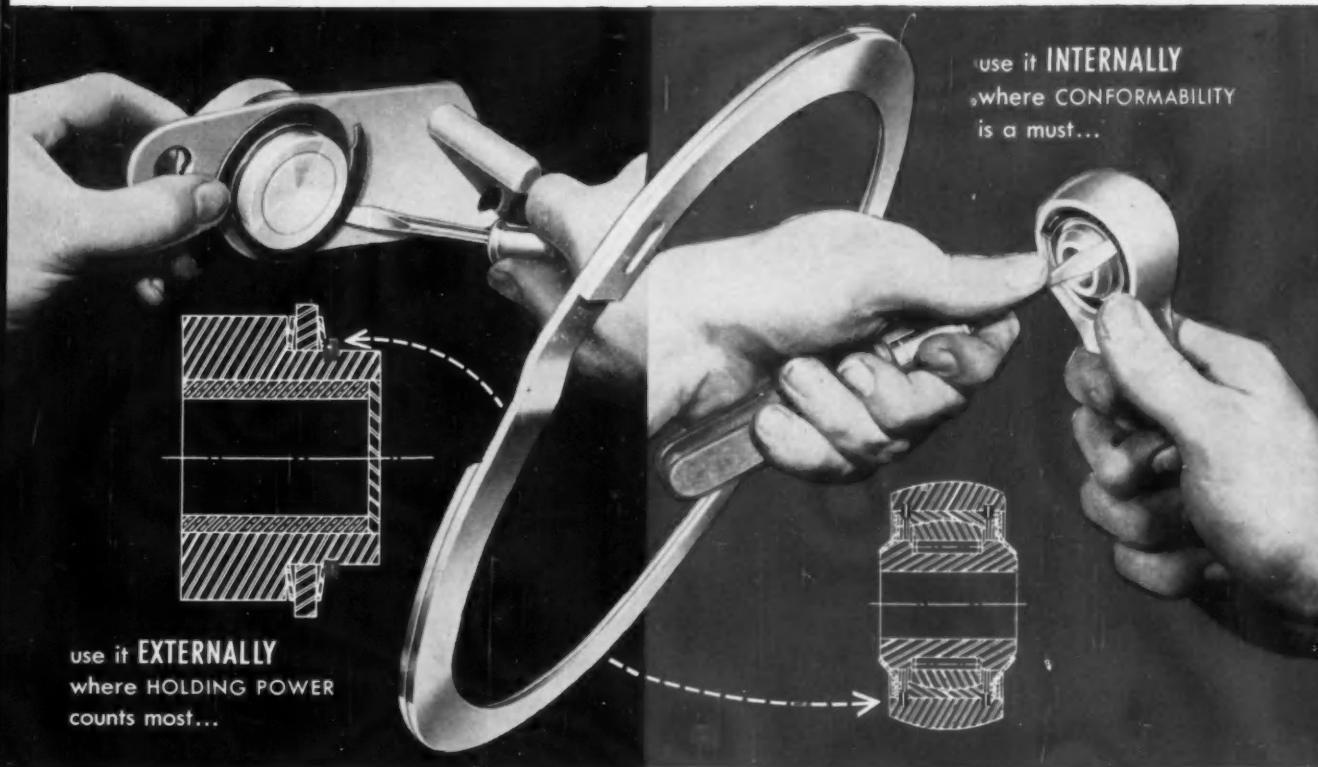
In the light of the foregoing uncertainties, it is hardly surprising that investor caution has grown. Admittedly, strength in consumer outlays could more than make up for any weaknesses that develop elsewhere, but for the present, trends in this area are not well defined and have been obscured by certain recent revisions of statistical data. Until the middle of August, it certainly seemed as if consumer attitudes were sluggish. The monthly retail sales series of the Department of Commerce indicated a sideward drift in spending, as did GNP data on personal consumption expenditures for goods. And this dovetailed with indications of less buoyant consumer attitudes that emerged from recent studies conducted by the Survey Research Center of the University of Michigan.

Uptrend in Consumer Expenditures

Very recently, however, the Department of Commerce has issued revised estimates of monthly sales for the spring and early summer period, and these—to the surprise of many people—show a notable uptrend in the dollar total of con-

(Turn to page 132, please)

there are hundreds of ways in which Industry uses **SPIROLOX** to solve retaining problems



use "easy-in, easy-out" **Spirolox** for compact design, removal of trouble-spots, elimination of costly machining and awkward parts!

The two application pictures above show how simply and effectively cylindrical parts assemblies are positioned and locked by Spirolox Retaining Rings in a toggle joint (right) and a friction clutch (left). Installed externally or internally, there's bearing surface all around... Spirolox conforms to the groove perfectly to resist centrifugal forces to a higher degree, and resist thrust forces up to its shear strength. In fact, because of its unique two-turn coil design, Spirolox will not jump the groove. Spirolox stays put because opening and closing force is resisted by friction created between the two turns. In operation, they are actually "squeezed" together to form a "friction lock!"

In addition to its remarkable stay-put characteristics, Spirolox Retaining Rings provide many advancements which every manufacturer wants. They make machines simpler, lighter, more compact. They eliminate costly machining as well as such old-fashioned fastening methods as keys, pins and collars. They spiral

into their grooves easily, saving time and labor in manual installation. They adapt readily to fixtures for automatic production line installation. They provide a uniform shoulder, without gaps or breaks to interrupt a uniform circumference... without lugs or projections to create weak spots. These retaining rings stay put, yet they come out again at the flip of a screw driver, ready for re-use... a great advantage when assemblies are serviced in the user's hands.

FREE SPIROLOX SPECIFICATIONS CATALOG may help you build a product of greater simplicity and greater sales appeal, by eliminating awkward features and trouble spots. Your copy is waiting to point out how your retaining applications can be handled surer, quicker, more economically with SPIROLOX! Address request for your complimentary Spirolox Specifications Catalog to **Thompson Products, Inc.,** Piston Ring Division (Ramsey Corporation) Dept. H, St. Louis 8 Mo.

Spirolox Retaining Rings are covered by United States Patent No. 2,450,425 and Foreign Patents. Other patents pending.

R-5660RT

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RETAINING RINGS
to hold moving parts TOGETHER!

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for
Samples



gapless • concentric • requires no special tools • easy-in,

easy-out • re-usable • stays put

Trends in Use of Selected Equipment on Passenger Cars

THE increasing popularity of "optional" or "special" equipment items on new passenger cars is shown in the accompanying tables. As compared

with other years, however, very few items which previously were optional have become standard. The comparisons below are given for 1956 and 1957.

1956 MODEL YEAR

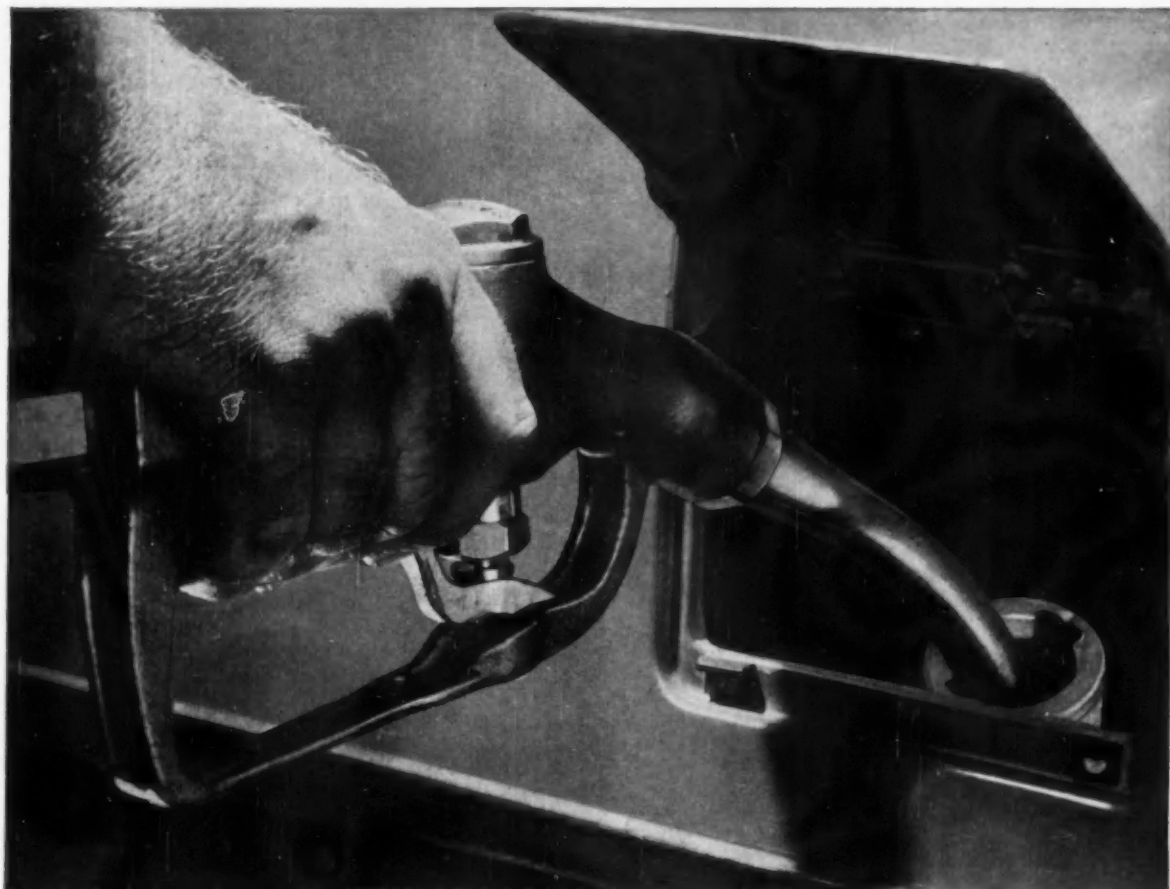
Percentage, Factory Installations Only

| | Ford | Lincoln | Merc. | Plymouth | Chrys. | De Soto | Dodge | Cad. | Olds. | Buick | Chev. | Pontiac | AMC | Stud. | Packard |
|--------------------|------|---------|-------|----------|--------|---------|-------|------|-------|-------|-------|---------|------|-------|---------|
| Automatic Trans. | 62.0 | STD | 88.8 | 61.5 | 99.4 | 96.6 | 88.8 | STD | 98.6 | 96.7 | 60.5 | 93.0 | 60.9 | 55.0 | 99.0 |
| Standard Trans. | 36.0 | NA | 8.1 | 34.0 | 0.6 | 0.9 | 9.7 | NA | 1.4 | 3.3 | 38.0 | 7.0 | 20.5 | 10.3 | 0.1 |
| Overdrive Trans. | 8.0 | NA | 3.1 | 3.7 | NA | 0.5 | 1.5 | NA | NA | NA | 3.5 | NA | 18.5 | 34.7 | 0.9 |
| Power Brakes | 4.0 | 98.5 | 36.7 | 5.6 | 73.4 | 62.7 | 15.2 | STD | 70.1 | 50.0 | 6.3 | 33.6 | 61.6 | 13.0 | 93.6 |
| Power Steering | 19.0 | STD | 26.5 | 6.4 | 87.4 | 73.2 | 22.0 | STD | 99.7 | 96.4 | 7.3 | 26.1 | 7.5 | 12.6 | 66.0 |
| Power Seats | 1.0 | 88.0 | 6.4 | 0.3 | 21.0 | 7.5 | 1.4 | 80.0 | 18.9 | 16.7 | 0.4 | 2.8 | NA | 2.1 | 30.3 |
| Power Windows | 1.0 | 86.0 | 4.6 | 0.4 | 19.3 | 5.6 | 1.3 | 80.0 | 17.5 | 14.6 | 0.5 | 2.7 | 1.0 | 3.2 | 27.0 |
| Radios | 65.0 | 99.0 | 85.0 | 36.8 | 85.6 | 68.3 | 44.1 | 95.0 | 90.7 | 89.8 | 66.5 | 96.5 | 55.0 | 43.5 | 92.0 |
| Heaters | 69.0 | 99.9 | 96.0 | 94.1 | 90.3 | 97.4 | 94.9 | 98.0 | 98.0 | 97.9 | 94.2 | 96.8 | 95.1 | 90.5 | 96.3 |
| White Walls | 50.0 | 98.6 | 76.9 | 46.8 | 86.8 | 78.2 | 53.6 | 90.0 | 90.9 | 83.1 | 40.6 | 69.1 | 54.0 | 62.4 | 65.7 |
| Air Conditioning | 1.0 | 16.3 | 1.1 | 0.2 | 7.3 | 2.3 | 0.7 | 25.0 | 4.7 | 3.6 | 0.9 | 2.4 | 6.7 | 2.5 | 4.3 |
| Tinted Glass | 22.0 | 94.0 | 52.6 | 19.6 | 62.1 | 52.4 | 21.9 | 93.0 | 44.1 | 69.8 | 16.2 | 26.3 | 39.7 | 28.0 | 54.5 |
| Windshield Washers | 43.0 | STD | 50.2 | 20.4 | 86.5 | 50.6 | 25.2 | STD | 78.0 | 77.4 | 24.0 | 26.2 | 23.0 | 21.6 | STD |
| Backup Lights | 39.0 | STD | 99.0 | 30.7 | 94.7 | STD | 52.6 | STD | 60.3 | 65.6 | 37.0 | 98.0 | 68.2 | 52.1 | STD |
| V-8 | 89.0 | STD | STD | 65.0 | STD | STD | 86.8 | STD | STD | STD | 57.6 | STD | 13.2 | 71.0 | STD |

1957 MODEL YEAR

Percentage, Factory Installations Only

| | Ford | Lincoln | Merc. | Plymouth | Chrys. | De Soto | Dodge | Cad. | Olds. | Buick | Chev. | Pontiac | AMC | Stud. | Packard |
|--------------------|------|---------|-------|----------|--------|---------|-------|------|-------|-------|-------|---------|------|-------|---------|
| Automatic Trans. | 71.4 | STD | 94.7 | 76.6 | 99.9 | 99.3 | 97.0 | STD | 98.9 | 98.0 | 66.0 | 96.0 | 60.0 | 68.7 | |
| Standard Trans. | 23.2 | NA | 3.9 | 20.2 | 0.1 | 0.7 | 3.0 | NA | 1.1 | 2.0 | 31.6 | 4.0 | 22.0 | 14.9 | |
| Overdrive Trans. | 5.4 | NA | 1.4 | 1.2 | NA | NA | NA | NA | NA | NA | 2.4 | NA | 16.0 | 26.4 | |
| Power Brakes | 9.6 | STD | 48.8 | 12.2 | 83.7 | 69.0 | 26.0 | STD | 82.4 | 57.3 | 10.5 | 45.1 | 24.7 | 14.3 | |
| Power Steering | 27.0 | STD | 50.9 | 17.7 | 97.1 | 81.5 | 50.0 | STD | 77.3 | 63.0 | 15.6 | 41.0 | 23.0 | 20.5 | |
| Power Seats | 1.9 | 88.0 | 12.3 | 0.5 | 38.0 | 8.0 | 2.3 | 76.0 | 12.3 | 17.9 | 0.3 | 1.4 | NA | 2.0 | |
| Power Windows | 1.8 | 86.0 | 7.3 | 0.6 | 35.3 | 8.0 | 2.1 | 80.0 | 2.7 | 16.8 | 0.5 | 2.3 | .004 | 2.1 | |
| Radios | 60.6 | 99.4 | 86.5 | 47.9 | 89.5 | 71.0 | 54.0 | 99.0 | 93.6 | 89.7 | 50.5 | 90.2 | 45.0 | 80.4 | |
| Heaters | 90.5 | 99.8 | 91.8 | 94.5 | 96.0 | 96.0 | 96.0 | 96.0 | 96.3 | 96.0 | 93.1 | 97.5 | 91.0 | 92.9 | |
| White Walls | 56.4 | 99.0 | 84.2 | 57.2 | 85.0 | 85.0 | 80.0 | 96.0 | 85.2 | 61.4 | 46.7 | 92.9 | 46.0 | 61.3 | |
| Air Conditioning | 0.5 | 22.0 | 5.3 | 1.5 | 14.1 | 5.0 | 2.6 | 32.0 | 9.9 | 6.3 | 1.1 | 3.9 | 6.0 | 37.0 | |
| Tinted Glass | 16.6 | 92.0 | 56.5 | 17.9 | 58.3 | 31.0 | 20.9 | 90.0 | 41.4 | 59.4 | 15.0 | 23.7 | 27.4 | 21.4 | |
| Windshield Washers | 37.5 | STD | 65.2 | 31.9 | 85.4 | 53.0 | 42.0 | STD | 79.5 | 76.0 | NA | 24.5 | 24.5 | 27.0 | |
| Backup Lamps | 41.2 | STD | 95.2 | 42.6 | 100.0 | 90.0 | 88.0 | STD | 66.3 | 62.6 | NA | 54.6 | 49.7 | 41.2 | |
| V-8 | 86.9 | STD | STD | 75.4 | STD | STD | 94.0 | STD | STD | STD | 63.6 | STD | 31.0 | 69.5 | |
| Dual Headlamps | NA | 98.0 | 32.6 | NA | 70.0 | 39.7 | NA | NA | NA | NA | NA | NA | 9.6 | NA | |



Can STROMBERG—champion economy carburetor—help sell cars?

The question is directed to manufacturers whose cars are not yet equipped with Stromberg Carburetors. Car makers using Stromberg now are also using its outstanding economy record in the Mobilgas Economy Run to convince thousands of economy-minded customers.

A large segment of your market—people in every income bracket—is always motivated by economy of operation as well as style, power and other good features. Proof that the motor car industry is well aware of this fact is its participation in the Mobilgas Economy Run every year, knowing how much a victory helps new-car sales.

Stromberg-equipped cars have won the coveted Sweepstakes Award in this national economy tournament two straight years!

If economy is a touchy subject instead of a good, solid selling feature with your line of cars, it will pay you to make comparative efficiency tests with Stromberg Carburetors against the field.

Remember, for more than forty years more advances in carburetion have been initiated by Stromberg than any other manufacturer. Stromberg application engineers are at your service.

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Original Equipment Sales: Elmira, N.Y. • Service Sales: South Bend, Ind.

Export Sales and Service: Bendix International Division, 205 E. 42nd Street, N.Y. 17, N.Y.

Stromberg® Carburetor  Bendix® Electric Fuel Pump  Bendix® Fast-Thru Starter Drive 

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ECLIPSE
MACHINE DIVISION
ELMIRA
NEW YORK

Bendix
AVIATION CORPORATION

• • INDUSTRY STATISTICS • •

1957 WEEKLY U. S. MOTOR VEHICLE PRODUCTION

As reported by the Automobile Manufacturers Association

| Make | Weeks Ending | | Year to Date | |
|---------------------------------|--------------|---------|--------------|-----------|
| | Aug. 24 | Aug. 17 | 1957 | 1956 |
| PASSENGER CAR PRODUCTION | | | | |
| Hudson | 6 | 0 | 1,351 | 4,347 |
| Nash | 15 | 0 | 3,576 | 11,073 |
| Rambler | 188 | 0 | 58,010 | 52,310 |
| Total—American Motors | 209 | 0 | 62,937 | 67,730 |
| Chrysler | 2,326 | 1,872 | 88,978 | 78,435 |
| De Soto | 2,492 | 2,498 | 86,670 | 70,516 |
| Dodge | 5,624 | 5,634 | 213,824 | 136,443 |
| Imperial | 540 | 559 | 29,681 | |
| Plymouth | 19,137 | 15,135 | 490,068 | 313,331 |
| Total—Chrysler Corp. | 26,119 | 25,698 | 909,228 | 599,725 |
| Edsel | 5,406 | 4,291 | 18,024 | |
| Ford | 28,919 | 26,408 | 1,045,553 | 894,094 |
| Lincoln and Continental | 330 | 269 | 28,967 | 33,326 |
| Mercury | 5,444 | 3,696 | 209,798 | 160,552 |
| Total—Ford Motor Company | 40,099 | 36,686 | 1,299,332 | 1,097,972 |
| Buick | 7,384 | 6,878 | 285,120 | 394,321 |
| Cadillac | 3,349 | 2,700 | 109,225 | 107,532 |
| Chevrolet | 31,771 | 31,534 | 1,036,002 | 1,105,412 |
| Oldsmobile | 7,030 | 6,987 | 278,058 | 312,074 |
| Pontiac | 7,172 | 6,694 | 247,334 | 233,777 |
| Total—General Motors Corp. | 56,706 | 54,393 | 1,956,739 | 2,153,116 |
| Packard | 0 | 3 | 6,118 | 13,289 |
| Studebaker | 0 | 823 | 40,285 | 54,154 |
| Total—Studebaker-Packard Corp. | 0 | 826 | 46,383 | 67,443 |
| Checker Cab | 61 | 61 | 2,781 | 2,359 |
| Total—Passenger Cars | 123,194 | 117,664 | 4,277,400 | 3,988,345 |
| * Included with Chrysler. | | | | |
| TRUCK PRODUCTION | | | | |
| Chevrolet | 6,413 | 7,355 | 239,273 | 248,371 |
| G. M. C. | 1,392 | 1,102 | 44,966 | 63,302 |
| Diamond T | 143 | 125 | 3,530 | 3,377 |
| Dodge | 40 | 24 | 2,027 | 2,573 |
| Dodge and Fargo | 1,771 | 1,516 | 54,026 | 60,278 |
| Ford | 6,245 | 5,531 | 234,969 | 204,851 |
| International | 2,535 | 2,345 | 90,053 | 91,092 |
| Mack | 381 | 342 | 11,442 | 12,199 |
| Reo | 121 | 132 | 2,998 | 2,570 |
| Studebaker | 0 | 127 | 7,166 | 11,114 |
| White | 262 | 0 | 9,893 | 11,930 |
| Willys | 1,046 | 0 | 40,740 | 38,490 |
| Other Trucks | 95 | 96 | 2,882 | 5,678 |
| Total—Trucks | 20,466 | 19,974 | 733,985 | 753,825 |
| Buses | 64 | 50 | 2,784 | 3,005 |
| Total—Motor Vehicles | 143,724 | 137,688 | 5,014,169 | 4,745,175 |

1957 TRUCK TRAILER SHIPMENTS

| Type of Trailer | Six Months | | |
|----------------------------|------------|--------|--------|
| | June | 1957 | 1956 |
| Vans | | | |
| Insulated and refrigerated | 482 | 2,545 | 3,068 |
| Steel | 56 | 353 | 617 |
| Aluminum | 424 | 2,192 | 2,451 |
| Semi-insulated | 30 | 343 | † |
| Steel | 30 | 343 | † |
| Aluminum | | | † |
| Furniture | 105 | 992 | 1,189 |
| Steel | 97 | 904 | 1,044 |
| Aluminum | 8 | 88 | 145 |
| All other closed-top | 1,556 | 10,201 | 14,432 |
| Steel | 645 | 4,940 | 6,081 |
| Aluminum | 911 | 5,261 | 8,351 |
| Open-top | 226 | 1,632 | 1,871 |
| Steel | 112 | 859 | 775 |
| Aluminum | 114 | 773 | 1,096 |
| Total—Vans | 2,399 | 15,713 | 20,560 |
| Tanks | | | |
| Petroleum | 350 | 2,495 | 2,665 |
| All other | 157 | 907 | 566 |
| Total—Tanks | 507 | 3,302 | 3,231 |
| Pole, pipe and logging | | | |
| Single axle | 43 | 223 | 351 |
| Tandem axle | 54 | 371 | 867 |
| Total | 97 | 594 | 1,218 |
| Platforms | | | |
| Racks, livestock and stake | 232 | 1,110 | 399 |
| Grain bodies | 91 | 912 | 721 |
| Flats, all types | 570 | 3,840 | 4,866 |
| Total—Platforms | 893 | 5,762 | 5,986 |
| Low-bed heavy haulers | 282 | 1,741 | 1,797 |
| Dump trailers | 178 | 1,178 | 1,115 |
| All other trailers | 305 | 1,793 | 1,618 |
| Total—Complete Trailers | 4,641 | 30,063 | 35,525 |
| Chassis | 507 | 1,822 | 1,972 |
| Total—Trailers and Chassis | 5,148 | 31,905 | 37,497 |

* Revised. Source: Industry Div., Bureau of the Census.

REGIONAL SALES OF NEW PASSENGER CARS

| Zone | Region | June | | May | | June | | Six Months | | Per Cent Change | |
|---------------------|--------------------|---------|---------|---------|---------|-----------|-----------|------------|---------|-----------------|---------------------|
| | | 1957 | 1956 | 1957 | 1956 | 1957 | 1956 | 1957 | 1956 | June over May | June over June 1955 |
| 1 | New England | 29,786 | 32,645 | 112,509 | 112,583 | 163,351 | 178,589 | — 8.76 | — 11.95 | — 8.53 | — 8.53 |
| 2 | Middle Atlantic | 106,239 | 112,509 | 74,054 | 64,765 | 590,489 | 582,449 | — 3.80 | — 3.80 | — 3.33 | — 3.33 |
| 3 | South Atlantic | 63,313 | 74,054 | 140,462 | 128,889 | 394,559 | 386,443 | — 14.50 | — 2.27 | + 2.10 | + 2.10 |
| 4 | East North Central | 124,997 | 140,462 | 26,272 | 24,298 | 771,854 | 771,644 | — 11.01 | — 3.02 | + 0.33 | + 0.33 |
| 5 | West North Central | 22,557 | 26,272 | 45,508 | 45,112 | 147,307 | 155,987 | — 14.14 | — 7.17 | + 5.56 | + 5.56 |
| 6 | East South Central | 42,356 | 45,508 | 50,361 | 46,017 | 266,496 | 266,098 | — 6.93 | — 6.11 | + 1.15 | + 1.15 |
| 7 | West South Central | 48,651 | 50,361 | 19,891 | 10,767 | 283,321 | 278,975 | — 3.40 | + 5.72 | + 1.58 | + 1.58 |
| 8 | Mountain | 19,860 | 18,236 | 56,277 | 64,574 | 100,767 | 101,676 | + 8.91 | + 1.86 | — 1.09 | — 1.09 |
| 9 | Pacific | 57,284 | 56,277 | | | 352,732 | 356,426 | + 1.79 | — 11.29 | — 1.04 | — 1.04 |
| Total—United States | | 517,043 | 556,324 | 539,777 | | 3,070,875 | 3,088,487 | — 7.06 | — 4.21 | — .87 | — .87 |

States comprising the various regions are: Zone 1—Conn., Me., Mass., N. H., R. I., Vt. Zone 2—N. J., N. Y., Pa. Zone 3—Del., D. C., Fla., Ga., Md., N. C., S. C., Va., W. Va. Zone 4—Ill., Ind., Mich., Ohio, Wis. Zone 5—Ala., Ky., Miss., Tenn. Zone 6—Iowa, Kan.,

Minn., Mo., Neb., N. D., S. D. Zone 7—Ark., La., Okla., Tex. Zone 8—Ariz., Colo., Ida., Mont., Nev., N. M., Utah, Wyo. Zone 9—Cal., Ore., Wash.

1957 TRUCK FACTORY SALES BY G.V.W.

As reported by the Automobile Manufacturers Association

| Period | 6,000 lb. and less | 6,000-10,000 lb. | 10,001-14,000 lb. | 14,001-16,000 lb. | 16,001-18,500 lb. | 18,501-26,000 lb. | 26,001-33,000 lb. | Over 33,000 lb. | Total |
|-------------------------|--------------------|------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-----------------|---------|
| First Quarter | 139,575 | 36,996 | 9,187 | 39,434 | 16,509 | 11,533 | 10,296 | 9,085 | 274,587 |
| Second Quarter | 137,091 | 45,632 | 11,961 | 51,060 | 22,469 | 13,032 | 9,953 | 10,530 | 301,808 |
| Total—Six Months | 276,666 | 84,668 | 21,148 | 90,494 | 38,978 | 24,565 | 20,251 | 19,615 | 576,395 |
| July | 48,089 | 13,099 | 3,061 | 15,074 | 7,655 | 5,130 | 3,275 | 2,541 | 94,924 |
| Total—Seven Months—1957 | 321,755* | 97,767* | 24,179 | 105,568 | 46,633 | 29,695 | 23,526 | 22,156 | 671,319 |
| Total—Seven Months—1956 | 287,573 | 122,341 | 25,233 | 125,654 | 49,784 | 36,520 | 30,343 | ** | 677,448 |

* Prior to January 1, 1957, vehicles below 10,001 lbs. G.V.W. were grouped "5,000 & less" and "5,001-10,000 lb." ** Included with 26,001-33,000 lb. group.

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LOW COMPRESSION SET

Butyl "O" RINGS



NEW

Another LINEAR first... a new, low compression-set Butyl Compound for use in "O" Rings. LINEAR Butyl Compound 7806-70 is a seal material that withstands compression set at elevated temperatures without being permanently deformed or losing its resiliency and its value as a seal. Also, Butyl withstands the chemical actions of the non-flammable phosphate esters such as "Skydrol", "Pydraul", "Celluflex" and "Lindol".

YET, PROVEN

Exhaustive tests, under method "B" of the ASTM, show this new LINEAR compound develops only 30 to

40% compression set after 70 hours at 212°F, as compared to the usual 70 to 95% set experienced with previous Butyl compounds. This unusually good resistance to permanent deformation, combined with a tensile strength of 2000 psi and an elongation factor of 275%, make this material an outstanding one for all "O" Ring applications and other molded shapes where Butyl rubber's excellent qualities are desirable.

Whenever you have a seal problem that is tough to handle—look to LINEAR for an answer. Write, or ask the local representative for complete information on LINEAR's new Butyl Compound 7806-70—today.



STANDARD AND OPTIONAL EQUIPMENT

On Leading Diesel Trucks, Tractors & Stationary Engines

Luber-finer

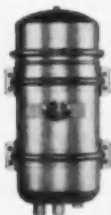
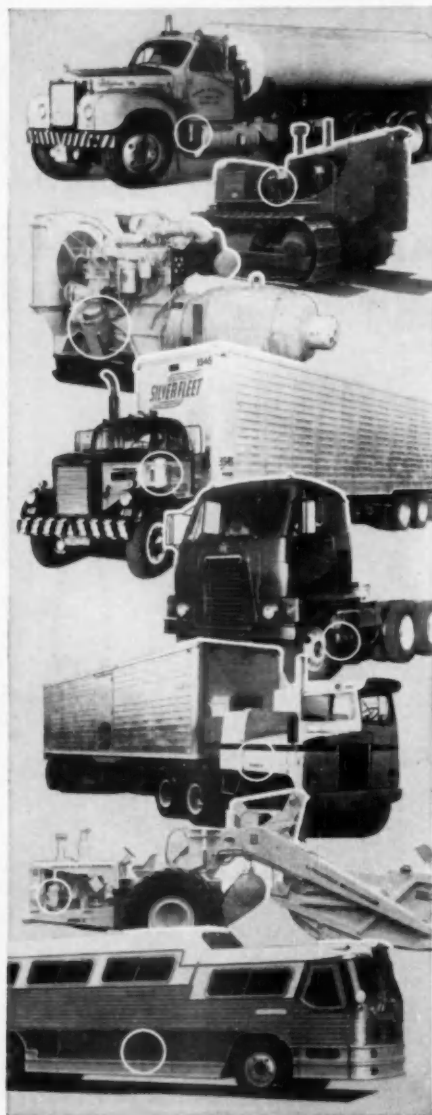
POWERFUL PROOF OF LUBER-FINER'S UNSURPASSED EFFICIENCY

Only Luber-finer Filters produce the patented filtering process that gives engineered protection to engine and oil as recommended by equipment manufacturers. The vital oil supply is circulated through Luber-finer's exclusive specially processed media which removes not only the injurious suspended solids from the oil but also the colloidal impurities which are often more damaging, thus increasing the life of both engine and oil.

THE EFFICIENCY OF LUBER-FINER'S PATENTED PROCESS HAS NEVER BEEN EQUALLED!

Luber-finer's patented filtering process adds thousands of miles to engine and oil life by cleaning oil faster and keeping it clean longer. Luber-finer gives more service and engineered protection than any other filter unit.

FOR EVERY TYPE OF ENGINE ...EVERY TYPE OF OIL



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DIESELPACK — Designed expressly for use with H. D. detergent compounded oils. The Dieselpak is unequalled in efficiency in removing impurities and contaminants without affecting the additives. (May also be used with fuel oil and straight mineral oil if desired).

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Installation of turboprop engines on a transport that uses conventional piston engines increased its power 63 per cent and decreased empty weight by 5000 lb.

Total flights by all passengers in two commercial transport models made by a single manufacturer in the past 10 years would equal the great task of flying the entire population of the U. S. from New York to Chicago.

The addition of 1/1,000th of an inch of thickness on one section of a guided missile adds 20 lb to the weight of the weapon.

The U. S. is paved with 840,000 miles of asphalt roads and highways—enough to circle the equator 33½ times.

It has been estimated that total population of the U. S. by 1975 will be 200 million persons. This is an increase of 40 per cent. During that same period, it is estimated that the work force will increase only 14 per cent.

Agricultural purchasing of farm production goods and services from industry, in terms of constant dollars, has risen 30 per cent since 1947 and is now rated at more than \$13 billion a year.

The Federal payroll costs over \$10 billion a year in taxes. That is greater than the entire annual cost of the Federal Government prior to World War II.

The average 1957 automobile engine generates enough heat at normal city driving speeds to keep a 24-room house at a temperature of 70 F in freezing weather.

A total of 40,000 Americans were killed in 1956 traffic accidents.

Ask about **Amp's Creative Approach**
TO BETTER WIRING

for every automotive

application

AMP

terminals



*Wherever there's a wire in a car
there's an A-MP Terminal to
connect it.*

- ▶ Top electrical and mechanical performance.
- ▶ Accepted by leading auto and truck manufacturers.
- ▶ Patented pressure-crimp eliminates all soldering and welding.
- ▶ A-MP Automachines crimp up to 4000 perfect, uniform terminations per hour with unskilled labor.
- ▶ A-MP Sales Engineers' electrical terminal knowledge in the auto industry will be valuable in solving your most difficult wiring problems.

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ON OUR WASHINGTON WIRE



Air Force spending programs are not being cut back anywhere nearly so severely as was first announced. The Air Force has succeeded in having about \$300 million of a planned \$1.25 billion cut restored by the Office of the

Secretary of Defense. Nearly all of this sum is being earmarked for missiles and missile development.

Congress next year may make it easier for good men to accept

responsible jobs in Washington. Under the present "conflict of interest" law, Government is finding it increasingly difficult to get qualified men willing to make the necessary personal sacrifices. Rep. Kenneth Keating, R., N. Y., says he plans to push for a more realistic law at the next session of Congress.

Pentagon's decision to place secrecy restrictions on missile tests is under renewed congressional criticism. Rep. John E. Moss, D., Calif., chairman of a House subcommittee investigating freedom of information, contends that because the public doesn't have enough information about tests, it is getting "an erroneous impression" that missile firings are failures. He says the military should stop trying to "classify the unclassifiable."

Unless Congress reconsiders, which is unlikely, or there is another emergency, tax amortization will be strictly limited for the next 30 months, and then would die altogether after Dec. 31, 1959. Congress this year passed legislation limiting rapid amortization to plants or equipment designed to produce new or specialized defense items or atomic or defense research facilities.

The country's population is growing so fast that it's outrunning official Government estimates. U. S. Census Bureau foresees 208 million Americans by 1970, but business firms planning for future had better count of there being millions more. Even the highest Bureau forecasts in the past have turned out too low.

What Federal taxes do to small business will be examined in 15 cities by a Senate group, starting this fall. Senate Small Business Committee members intend to gather and record the views of businessmen in each city. It's the committee's hopes that the material it comes up with can be the basis of a small business tax bill in 1958.



Passes Tests With Flying Colors

MILITARY AIRCRAFT MOTOR

...equal dependability for your product

One of the recent Lamb Electric developments is a motor to drive submerged pumps on military aircraft—for transfer of fuel from reserve to engine tanks.

For such an important application, motor reliability far beyond that normally called for was needed. To insure this degree of reliability in its actual operation of driving the submerged pump, test requirements for the motor were exceptionally rigorous.

As the result of advanced engineering and design, greatly increased brush life, and ability to operate at extremely high temperatures and withstand severe shock tests, the motor passed gruelling tests with flying colors.

The skill and experience exemplified here is available to your company to provide dependable power for your new or redesigned products.

THE LAMB ELECTRIC COMPANY • KENT, OHIO

A Division of American Machine and Metals, Inc.

In Canada: Lamb Electric—Division of Sangamo Company Ltd.—Leaside, Ontario

Lamb Electric

SPECIAL APPLICATION
FRACTIONAL HORSEPOWER **MOTORS**

NEW SUNVIS 916

SAME OIL
AFTER 3 YEARS
OF HARD SERVICE

Comparative Tests Prove . . .

Sunvis 900 Oils have years of useful life under severe operating conditions

Versatile, long-lasting Sunvis® 900 oils are especially made to provide superior lubrication at high temperatures and in the presence of moisture. *They keep maintenance costs low.*

Time and again, when checked against new-oil specifications, used Sunvis 900 oils prove themselves fit for many more years of continued service, with no loss in performance features.

For example: The 3-year-old sample above was used in an injection molding machine operated for 40-48 hours per week at temperatures between 100 and 125 F. To see how the used oil compares with its original specifications look at the following table.

| Specifications | Now Sunvis 916 | Sunvis 916 After 3 Yr* |
|-----------------------------|----------------|------------------------|
| API gravity at 60 F | 30.5-32.5 | 30.3 |
| Flash, open cup, deg F, min | 400 | 400 |
| Fire, deg F, min | 460 | 460 |
| Viscosity, SUS at 100 F | 150-160 | 173.0 |
| Viscosity index | 90 | 90 |
| Neut. number | 0.10 | 0.05 |
| Color, ASTM | 1-1.5 | 3.5 |

*Typical Test

HOW TO GET MORE INFORMATION

Call your Sun representative, or write for Technical Bulletin No. 35, Sun Oil Company, Philadelphia 3, Pa., Dept. I-7.

INDUSTRIAL PRODUCTS DEPARTMENT
SUN OIL COMPANY
PHILADELPHIA 3, PA.

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IN CANADA: SUN OIL COMPANY LIMITED, TORONTO and MONTREAL

Tru-Stop Brakes

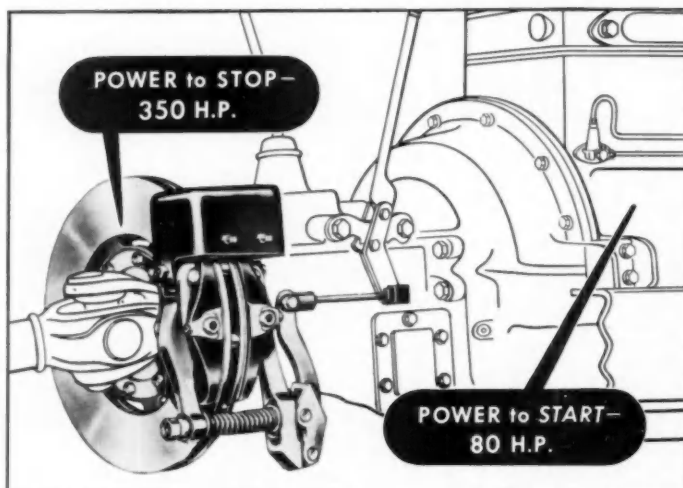
Meet Every Heavy-Duty Safety Requirement

OFFER POSITIVE PROTECTION
AGAINST RUNAWAY OR PARKING
ACCIDENTS—AT LOWEST COST

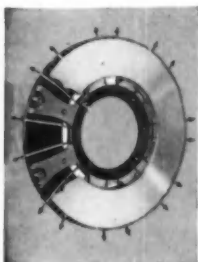
HERE IS WHY:

**They have surplus power
required for emergency
service—no dangerous
self-energizing**

TRU-STOP Heavy-Duty Emergency Brakes are not only excellent parking brakes. They serve as a complete, independent and fully reliable braking system. Operating on the propeller shaft they enable the driver to continue on safely in the event of service brake failure. TRU-STOP brakes have the surplus braking capacity to be used repeatedly as an auxiliary to service brakes.

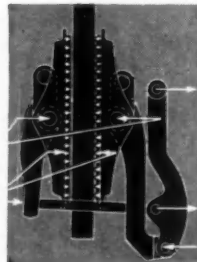


Brakes actually do more work than the engine in terms of horsepower. Where it takes 80 HP to accelerate to 20 miles per hour, it takes 350 HP to make a safe stop from 20 miles per hour within required limits



Ventilated to throw off heat

Brake efficiency depends on ability to throw off intense heat—rapidly. Discs of TRU-STOP brakes are exposed to the air even during the braking operation. Ventilated design circulates air between the disc plates.



Give uniform brake pressure

Disc of TRU-STOP brakes is "squeezed" between the flat surface of the shoes. Effort applied to brake lever operates front and rear lever arms simultaneously. Pressure is exerted on the center of each shoe. Entire lining surface is in contact.

FOR SAFE, ECONOMICAL, HEAVY-DUTY BRAKING WITH MAXIMUM LIFE AND MINIMUM MAINTENANCE

TRU-STOP Brakes are used on a great variety of mobile and stationary equipment

SUCH AS—

Motor cranes
Road rollers
Dump trucks
Power dividers
Cooling tower fans
Oil well pumps
Cold header presses
Scrubbing machines
Wire rope stranders
Fork lift trucks
Motor scrapers

Tractors
Graders
Diamond core drills
Electric locomotives
Oil well servicing rigs
Railway inspection cars
Shapers
Power take-offs
Winches
Motor shovels

Tractor loaders
Conveyors
Hard rock drill positioners
Mine locomotives
Power presses
Railway power ballisters
Cable tool spudders
Aerial tram cars
Tension wire stringers

We will be glad to answer any questions or give you more detailed information about TRU-STOP Heavy Duty Emergency Brakes.

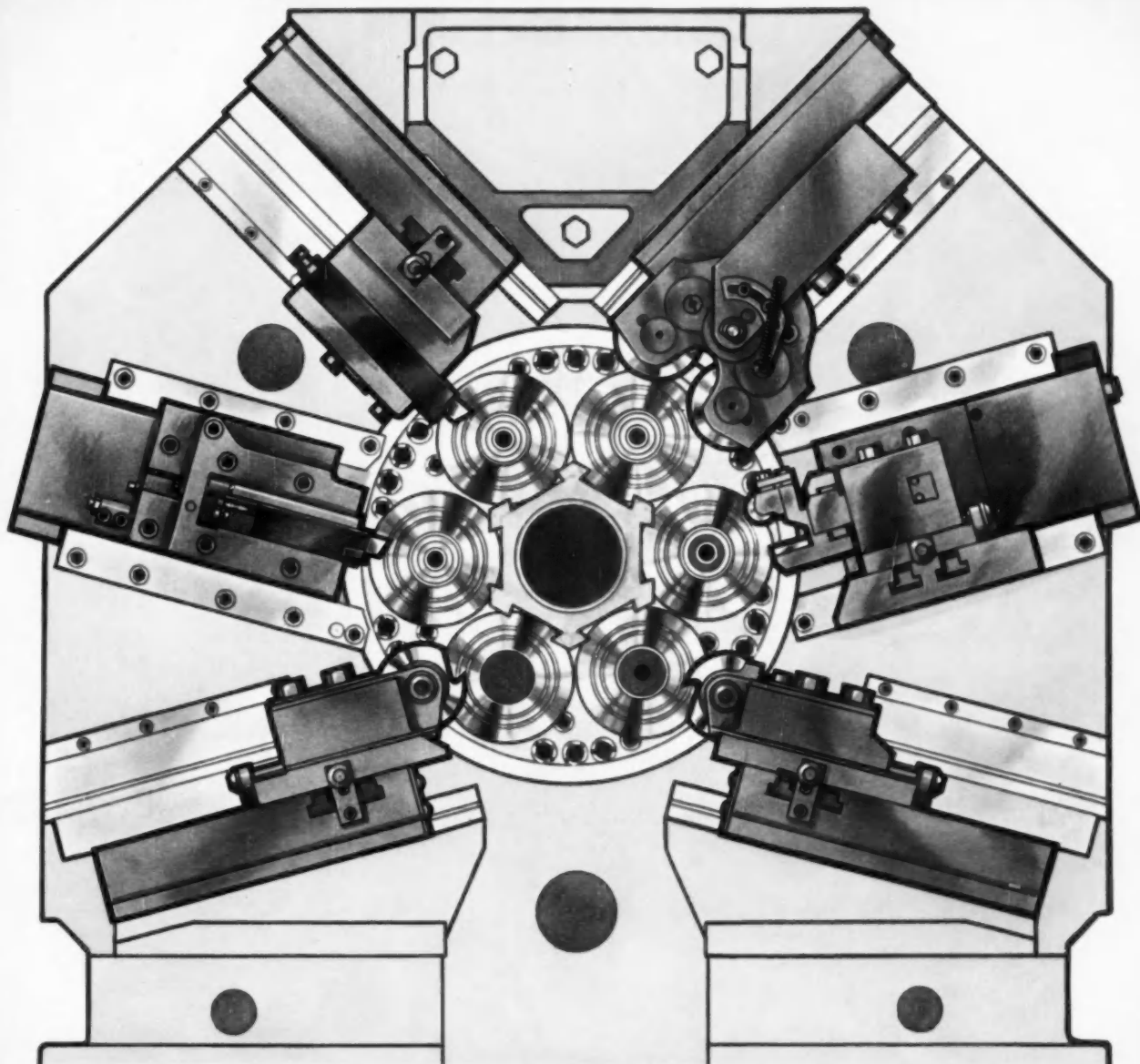
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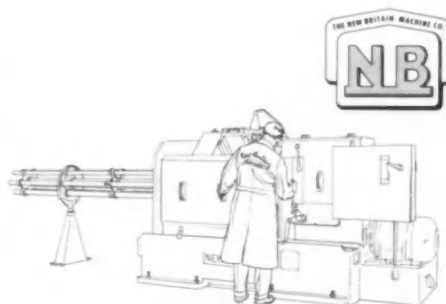
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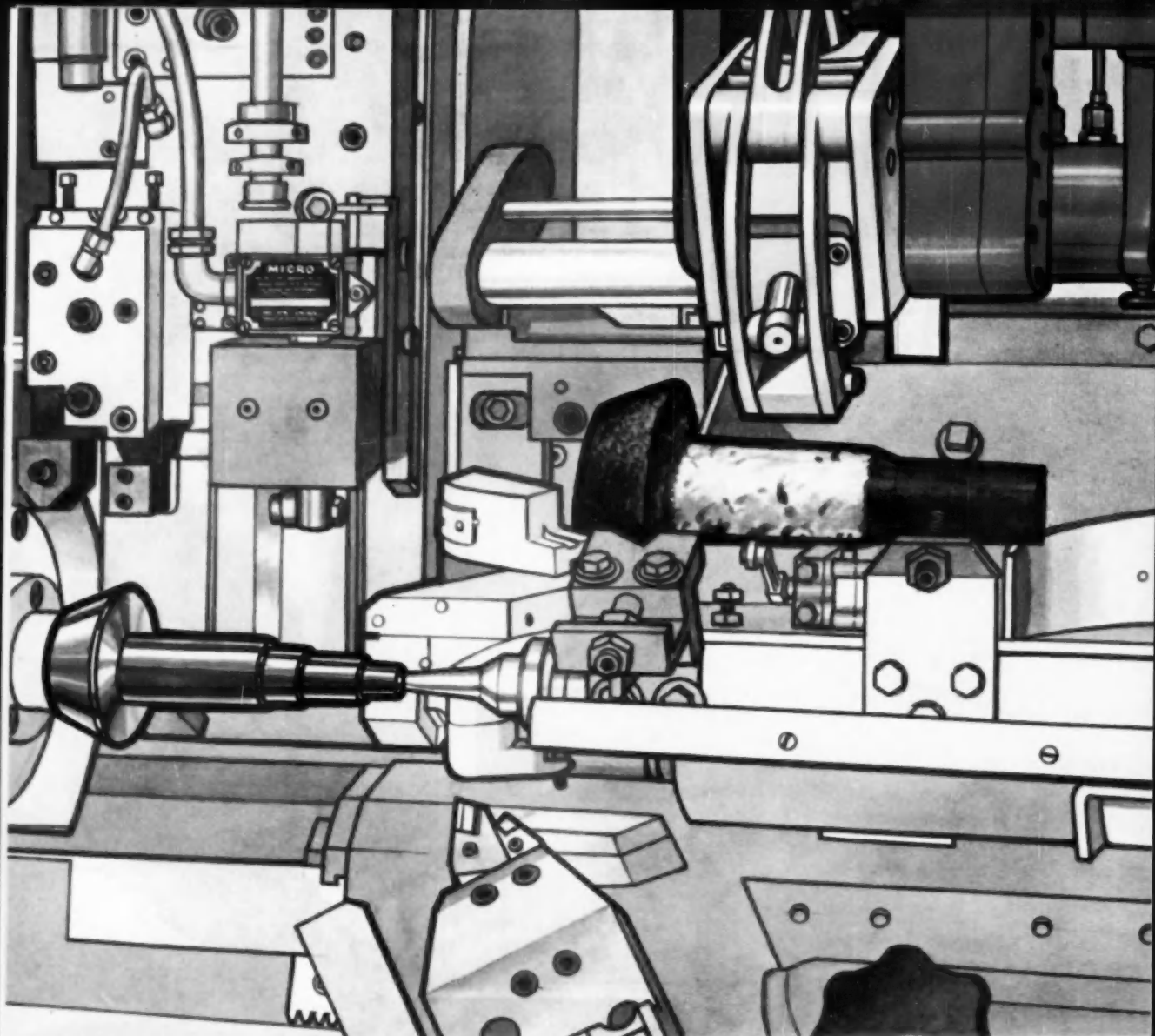


six spindles — six cross slides

Here you see the possibilities for new flexibility of bar machine set-ups with a *cross slide in every position*. Six independent cross slides. More operations on one bar machine. Six independent radial cross slides for forming, roll threading, shaving, skiving, angular facing, knurling, hobbing and undercutting with simpler tools and attachments, through the use of cross slides. The New Britain Machine Company, New Britain-Gridley Machine Division, New Britain, Connecticut.



Automatic Bar Machine



no hands — no headaches

Automatic loading of forgings, bar slugs and bar stock is a basic optional design feature of New Britain +GF+ Copying Lathes. It saves labor and makes a substantial reduction in production time per piece.

Positive, accurate loading, single point tooling and template control mean fewer headaches and larger profits on your lathe work. The New Britain Machine Company, New Britain-Gridley Machine Division, New Britain, Connecticut.

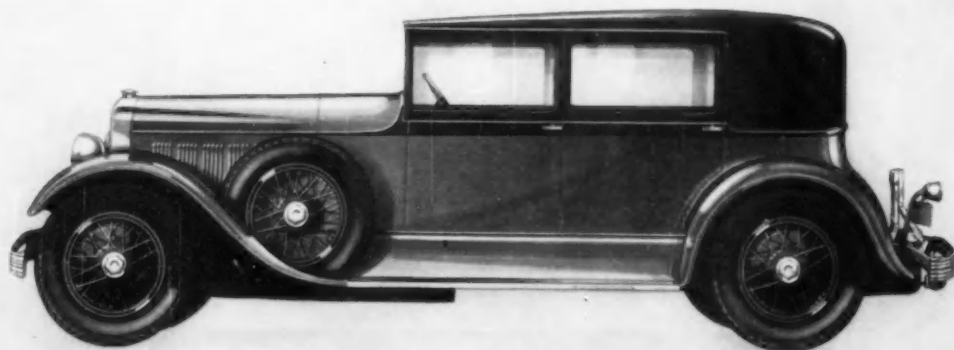


New Britain +GF+ Copying Lathe

Chance Vought F8U-1 Crusader



They are the same...in these two ways



Chrysler Imperial "60"—1924

...engineering leadership and filtration by Purolator!

Thirty-four years ago, that Chrysler came off the assembly line equipped with something entirely new: an oil filter. By 1956 when the Chance Vought F8U-1 Crusader shattered the national speed record, filters were accepted as basic components on all automobiles and aircraft. Both events were milestones — both vehicles were protected by Purolator.

The 1924 Chrysler seems a relic of another age, while the Crusader is as new as tomorrow. But the concept that got its start with the Chrysler has become fundamental everywhere... any fluid — be it air, fuel, lube oil, hydraulic fluid or anything else—which is vital to the proper operation of any aircraft, auto-

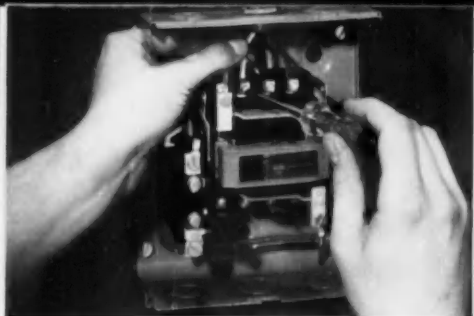
mobile or machine, must be filtered to be kept free of contamination.

Purolator makes filters for every fluid known to man—for use in any conceivable application. The unique background of specialized know-how enables them to produce the best possible filters for the specific needs of the automotive industry — no matter what they are or when they arise.

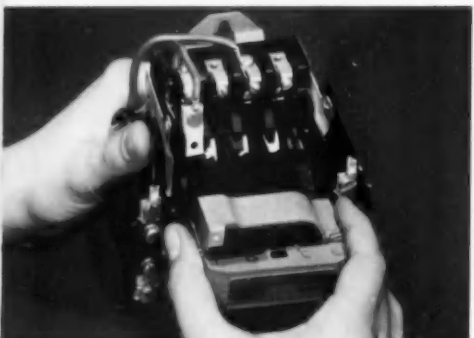
Filtration for Every Known Fluid

PUROLATOR
PRODUCTS, INC.

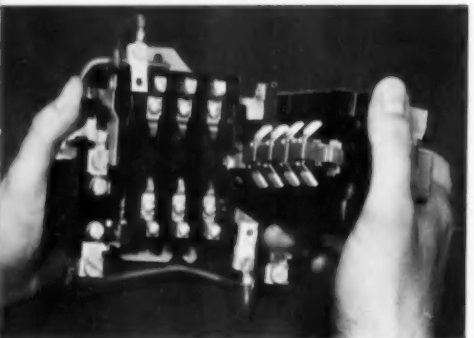
Rahway, New Jersey and Toronto, Ontario, Canada



NEW **GREATER WIRING SPACE**
Wrap-around cover—removable enclosure sides make wiring much easier.



NEW **SNAP-SLIDE CONSTRUCTION**
Principal components quickly disassembled for easier inspection and maintenance



NEW **"VERTICAL" CONTACTS**
Continuous dependable operation of new starter—even in dusty atmospheres



NEW **ADJUSTABLE OVERLOADS**
Overload trip setting can be adjusted plus or minus 15% of nominal heater rating.

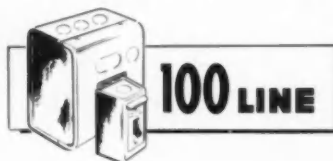
General Electric announces **NEW** Size 0 and 1 Magnetic Starters— 42% Smaller in Size

General Electric now offers a new line of Size 0 and 1 magnetic starters that is 42% smaller than previous open forms and is built to the new NEMA ratings. The new starters with "snap-slide" construction provide easier inspection and maintenance because principal components snap or slide together. Completely new and radically different in design, this line of starters offers:

- wrap-around cover with spring latch—easily removed without tools for inspection
- removable sides for greater accessibility
- straight-through wiring speeds installation
- pressure-type terminals make wiring easy
- vertically-slanted contacts give higher tip pressure, reduce possibility of contact welding
- long life "kick-off" spring provides clean break of contacts in any mounting position
- strongbox coil with Mylar* insulated start wire for longer coil life
- overload relays adjustable for $\pm 15\%$ of trip setting
- nine field modification kits for greater flexibility
- new maximum NEMA ratings up to $7\frac{1}{2}$ hp at 220 volts and 10 hp at 440 volts

Two additional features of the new magnetic starter are extremely quiet operation and lower inrush requirements of the coil. Sound absorbing material around the magnet lowers the operating noise level. Lower coil inrush current will allow you to use a 47% lower rated control transformer with this starter—saving you money and mounting space.

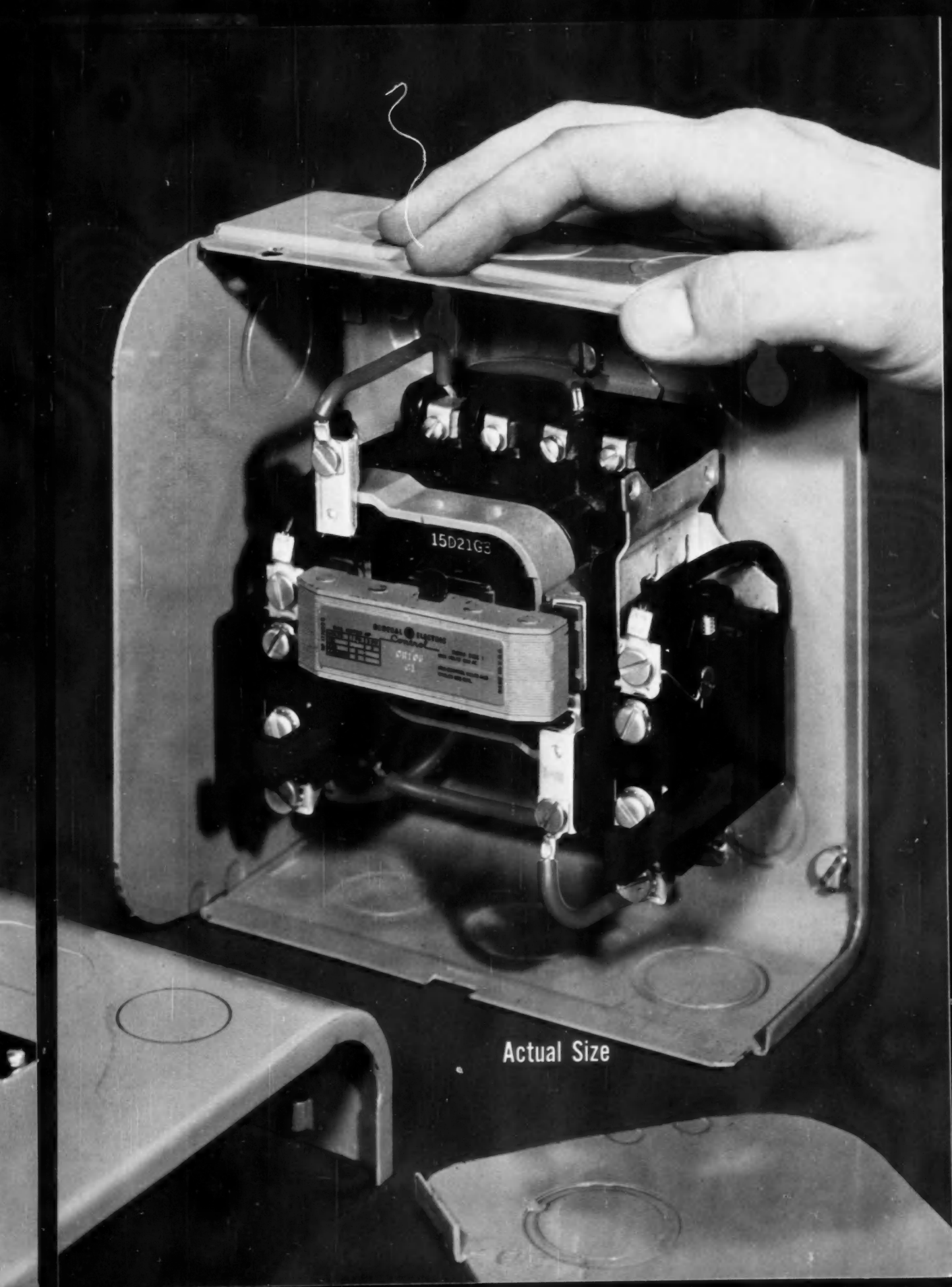
Size 0 and 1 General Electric starters are available now in non-reversing, combination, reversing and multispeed forms. Contact your nearest General Electric Sales Office or Distributor, or write Advertising Section 731-13 for the 20-page bulletin describing the line. Ask for GEA-6611. General Electric Company, Bloomington, Illinois.



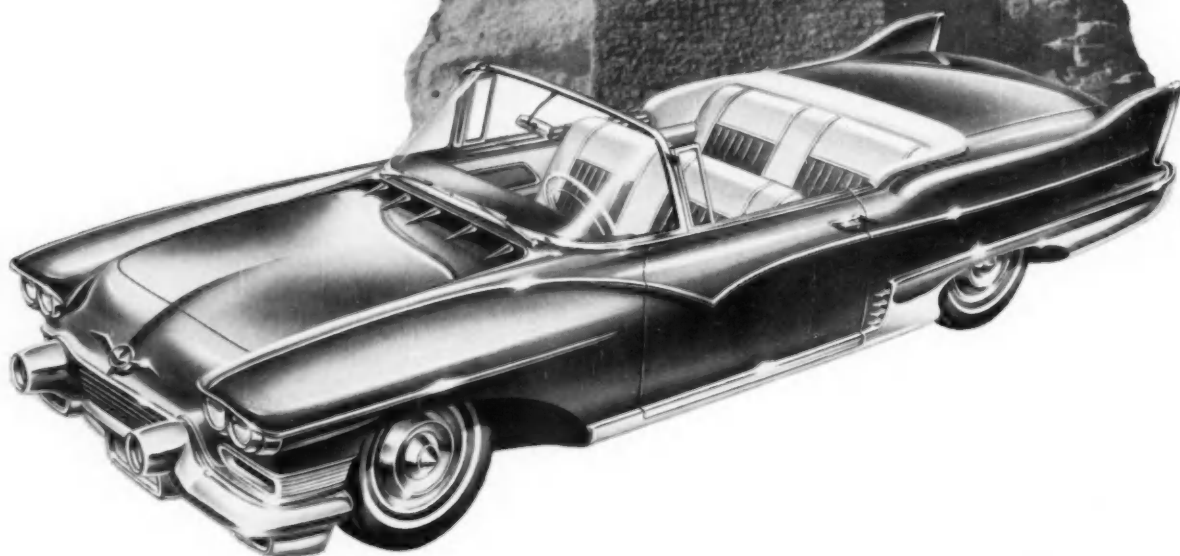
*Trade-mark of DuPont Co.

Progress Is Our Most Important Product

GENERAL  ELECTRIC



Built to Last!



The Great Sphinx of Giza, carved from solid granite, has withstood the ravages of many ages —

Autos aren't expected to live quite as long, of course. Yet car buyers expect "production-line" beauty and durability for the life of the car. And stainless steel, solid and enduring like the Sphinx, gives that permanent beauty and utility to critical parts and trim.

Nothing gleams and lasts like handsome, solid stainless. It's not only an extra *initial* sales advantage — it helps cars bring more in *resale*, too.

Car customers are attracted to stainless. They know it as the "no-trouble" metal that can't be hurt by fumes, road chemicals, rough weather . . . that comes bright and clean with just soap and water! And they know it does not dent and scratch like other materials.

Give them what they're looking for. *Make it better, make it stainless!* And remember that the finest stainless steels are made with Vancoram Alloys. Call your supplier for details.



VANADIUM CORPORATION OF AMERICA

420 Lexington Avenue, New York 17, N. Y. • Chicago • Cleveland • Detroit • Pittsburgh

Producers of alloys, metals and chemicals

The Evolution of Automotive Finishes

(Continued from page 72)

solvents and the drag on the brush.

Early nitrocellulose lacquers, because of low solids content, had to be sprayed in thin layers. Eight to 10 coats were generally required to finish the car, then the body was buffed to a high gloss—but the entire finish could now be applied in one day.

These lacquers were lighter in color than oleoresinous varnish-based finishes. This feature plus improvements in pigments permitted use of a wider range of colors—a limited selection of blues, grays and greens relieved the somber brown and black of earlier years.

A pigment is described in its simplest terms as a substance which is insoluble in the medium in which it is suspended or dispersed. Up until 80 years ago the great majority of pigments in commerce were of natural origin, mostly inorganic in nature. The further rapid growth of the chemical industry since the turn of the century, and most markedly since 1920 in the United States, has greatly increased the number and type of available raw materials from which pigments can be derived.

On the debit side, finishes of this period lacked hue and chroma; they tended to fade, chalk and crack; and although plasticizers were incorporated, the finishes were brittle.

1926-1935—The New Coat

The next radical development in coatings was the discovery of oil-modified alkyd resins, developed by reacting phthalic anhydride and glycerine with a drying oil. This built up larger molecules than formerly possible with varnishes prepared by cooking drying oil with hard resin. The new resins utilized simple hydrocarbons solvents but cured by oxidation (although far more quickly than did the older varnishes). Through applications of heat in a baking

oven, drying time was reduced to an approximate two hours. These resins were superior to the nitrocellulose lacquers of the period because of extended durability; greater toughness; wider possible color range; less cracking and chalking (still not perfect in this respect); high gloss without buffing and the need for only one coat plus a primer coat (due to ability to apply thicker film).

1936-1937—Lighter and Lighter

Colorless butylated urea-formaldehyde resins were introduced during the 30's to permit use of even lighter colored pigments. There were obstacles to their use, too—although urea resin used alone produces a hard film after baking, the film is too brittle for practical application without plasticization.

The alkyd enamels had lacked surface hardness but the new urea resins were too hard. The solution: a combination of the two.

The most efficient mixture was composed of 20 to 30 per cent butylated urea-formaldehyde resin and 70 to 80 per cent oil-modified alkyd resin. The finish based on this combination was close to our modern baked enamel finishes. Chemical reaction of the urea-alkyd resin mixtures in a one-hour baking schedule at 250 to 275 F produced a superior finish possessing hardness, adhesion, flexibility, durability and high gloss.

Progress, too, was being made with nitrocellulose lacquers. Alkyd resin plasticizers were found effective in combination with these lacquers because they permitted solid contents of lacquers to be increased heavily, reducing the number of coats needed. They still had to be baked and buffed to present optimum initial appearance but (unlike the urea-alkyd enamels) there was no orange peel effect. The synthetic enamels held their gloss longer—but the lacquers could more readily be repolished to a high gloss.

(Turn to page 124, please)



From choice of materials, gauging of tools, training of workers, down through the final inspections — Quality is the goal at Southern.

Southern fasteners on your assembly line mean smooth and speedy production and a better competitive position for your product.

Over a billion screws and bolts in stock. Five points of shipment for quick delivery.

Write on company letterhead for free samples and Southern's Stock List, or for the Warehouse Guide from the Southern warehouse nearest you. Address Box 1360-A1, Statesville, North Carolina.

Wood Screws • Stove Bolts • Machine Screws & Nuts • A, B & F Tapping Screws Roll Thread Carriage Bolts • Dowel Screws Hanger Bolts • Wood & Type U Drive Screws



Warehouses: NEW YORK • CHICAGO • DALLAS • LOS ANGELES

AIRBRIEFS

(Continued from page 94)

lenses alone are valued at \$3000.

The camera was built by Robertson Photo-Mechanix, Inc. of Chicago. It weighs more than 10,000 lb, is 30 ft long, 8¾ ft high and 7 ft wide. It is able to reproduce templates ranging in size up to 5 ft by 12 ft and within 0.002 in. tolerances. Drawings will be projected on a sensitized plate of steel, aluminum, or sensitized glass cloth, then machining or cutting the resultant pattern.

Pneumatic Power Unit Operates at 1000 F

Lear, Inc. of Grand Rapids, Mich., has announced a new pneumatic power unit which operates in temperatures far above the tolerance range of known hydraulic or electrical systems. The new device develops exceptionally high torque at relatively low speeds, according to company engineers, and does not disintegrate under overspeed conditions.

It offers a reliable, fast-response power source for such applications as thrust reversers, accessory drives, actuation of air inlet and nozzle-positioning systems, and reactor-rod positioning. The unit may be used as a power unit for remotely-located screwjacks of linear actuators and is adaptable to a wide range of actuation methods.

An exceptionally high torque-to-inertia ratio allows the units to follow electronic modulation and to deliver virtually instantaneous starts and stops. One model reportedly accelerates from zero to 100 rpm in 0.00004 sec, operating under 30 psig of applied air pressure against an opposing force of 20 lb-in. Units are instantaneously reversible and are claimed to be equally efficient in either direction.

Business Aircraft—Tenth Annual Meeting

The National Business Aircraft Association will hold its Tenth Annual Meeting and Forum on October 2-3-4, 1957, in Denver. Among

the highlights of the convention will be the public introductions of three, new, for-business-use aircraft—The Piper "Comanche"; The Lockheed Utility Jet Transport "329," and the Vertol 44-Helicopter. Other light aircraft, helicopters, and full scale cabin "Mock-Ups" will be featured at the Mile High Center Building, NBAA's exhibit area in the heart of downtown Denver.

The application of turbo-prop

aircraft for business use will be examined on the third day of the meeting. Invitations have been accepted by Vickers, Fairchild, Grumman, On Mark, and Lockheed, to tell the manufacturers story on turbo-prop aircraft that will be available to the business aircraft market.

Turbo-prop engine manufacturers—Rolls Royce, Allison, and Napier—will present performance characteristics of their engines.



Why
DOLE THERMOSTATS
lead the field



Presentations of case histories in the use of turbo-prop aircraft will be made by representatives of Capital Air Lines, The U. S. Air Force and by Standard Oil Co. of California to complete the turbo-prop business aircraft program.

Other program features include a detailed exploration of the management policies of various types of business aircraft user companies. Ranging from questions and answers on the number of com-

pany executives in one aircraft to pilot training programs—the panel and NBAA members will make recommendations which will later be contained in a NBAA manual—"Guide to Management Policies for Business Aircraft."

Flying "Jeep" Contract Awarded

Piasecki Aircraft Corp. has been selected by the Transportation Re-

search and Engineering Command of the United States Army to build and test a flying counterpart of the World War II ground vehicle widely known as the Jeep.

The new vehicle represents a unique concept in the realm of aerial operations. Its rotor blades are protected by shrouds permitting it to operate in streets, between buildings and among trees. At the same time, its agility and small size lends itself to quick movements and easy concealment or camouflage.

The airjeep has another valuable characteristic in its ability to fly in visible contact with column movement of troops or vehicles along roads, under bridges and even through tunnels, in bad visibility conditions that would ground other types of aircraft.

The initial contract award to Piasecki Aircraft amounts to over \$650,000. It followed a nation-wide competition participated in by 20 leading aircraft and automobile manufacturers.

AiResearch Opens Pneumatic Control Building

Formal opening of The Garrett Corporation's new AiResearch pneumatic controls building took place this month in Phoenix, Arizona. In the new 40,000 sq ft plant, 500 employees are at work producing, designing and testing controls for air, liquids and gases for commercial and military aircraft and for missiles and rockets.

Use of pneumatics in new aircraft and missiles is increasing. A DC-7 Douglas Airliner uses 70 different valves and controls. Advanced controls are now being produced by AiResearch for the Boeing 707, the DC-8, Convair 880, Lockheed Electra, the British Vickers Viscount and the French Sud-Est Aviation's Caravelle.

Operation of pneumatic powered systems and controls in temperatures from -500 F to 1000 F make them especially adaptable for missile and rocket use. Precision pneumatic controls are used in the Atlas, Thor, Regulus, Bomarc and Titan missiles.

Facts about "Who's Who" in thermostats

DOLE started on the road to leadership more than 50 years ago as a manufacturer of fine precision valves and controls.

DOLE pioneered and produced the first successful automotive waterline thermostat.

In 1946 DOLE pioneering paid off again with the development and introduction of the first satisfactory solid expansion type thermostat for automotive use.

In 1952 DOLE introduced a unique and highly efficient quality-control system which made possible volume production with the utmost in precision and dependability. (Each DOLE Thermostat is individually tested four different times . . . for leakage, temperature, flow and calibration.)

Today, DOLE Thermostats are standard equipment on 38 cars, trucks, commercial vehicles, tractors, industrial and marine engines. And that includes 19 out of 20 top passenger cars.*

That's LEADERSHIP . . . earned . . . and retained year after year.

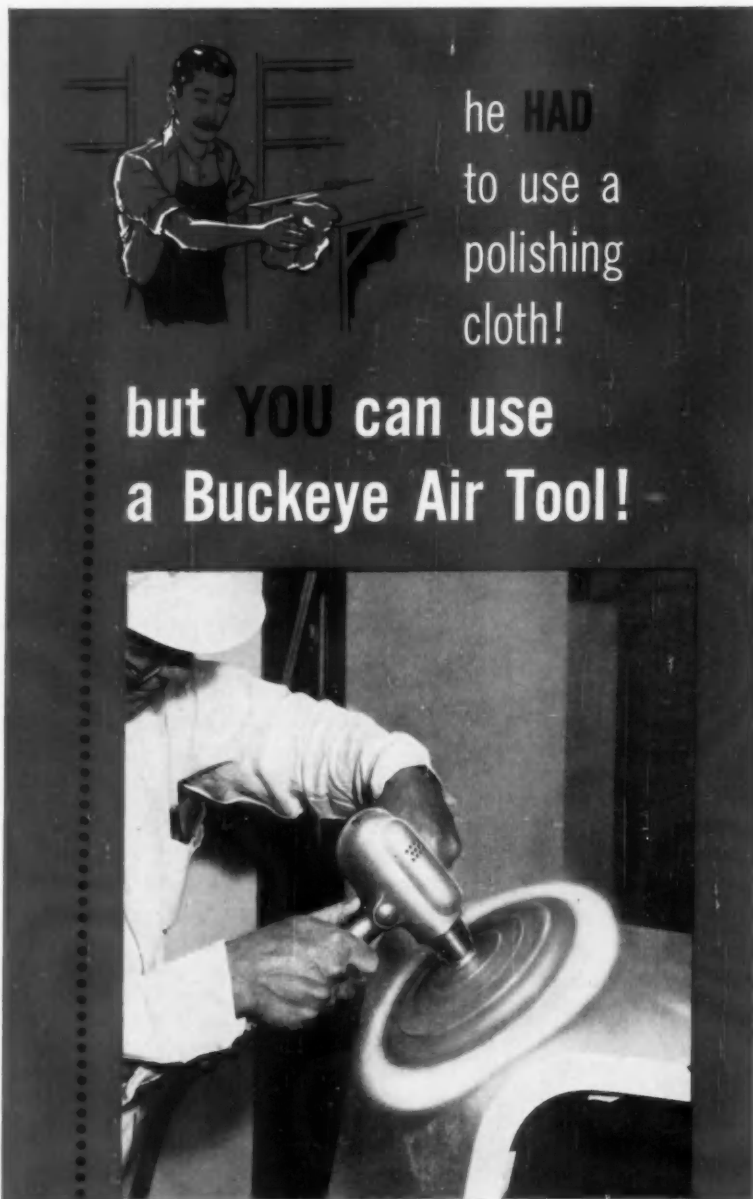
*As listed in Automotive News.

Control with

DOLE®

THE DOLE VALVE COMPANY

6201 OAKTON STREET, MORTON GROVE, ILLINOIS (Chicago Suburb)



he **HAD**
to use a
polishing
cloth!

but **YOU** can use
a **Buckeye Air Tool!**



Why AIR Tools?

Because air is everywhere, just waiting to be put to work... because continuous operation can't possibly harm an air tool... and because, if you're using Buckeye air tools, you can almost forget about tool maintenance.

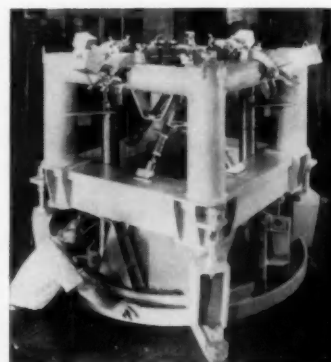
In Air Tools,
Your Best Buy
Is Buckeye

The old line craftsman, rubbing away diligently with his polishing cloth, took a great deal of pride—and a great deal of time—in his work. The modern craftsman, guiding a compact, lightweight Buckeye polisher or buffer, takes just as much pride in his work, and accomplishes far more in much less time. Mass production and pride of craftsmanship still go hand in hand, with modern Buckeye air tools.

Buckeye Tools
CORPORATION
DIVISION 21 • DAYTON 1, OHIO

Industry News

(Continued from page 39)



VANGUARD FIRING STAND

Designed to both test and launch the Vanguard rocket, the firing stand shown here is equipped to support the rocket and hold it in an exactly vertical position, weigh it, and disconnect more than 20 fuel and instrument lines at the instant of firing. Designed and built by Loewy-Hydropress Div. of Baldwin-Lima-Hamilton Corp., the stand is now mounted on the launching platform at Cape Canaveral, Fla., ready for action.

Curtiss-Wright Displays New Family of Materials

A new material, called Curon, will be demonstrated at the Waldorf-Astoria Hotel, from Sept. 23-27.

Developed and produced by Curtiss-Wright Corp., Curon is described as a whole family of materials with an extremely wide range of properties and with applications in many industries.

Air Force Cancels Contract For XF-103 Experimental Jet

The Air Force has canceled the contract for the XF-103 experimental fighter which was under development at Republic Aviation Corp. The craft was to have been powered by a new-type propulsion system produced by Curtiss-Wright Corp. for which the Air Force said it has no other use at this time.

The Air Force said the plane was cancelled for economy reasons, but added that knowledge gained from it can be used on other planes.

The XF-103 was designed originally to be a high-performance, all-weather interceptor, but it was later designated a flight research model.

(Turn to page 129, please)

New Thompson automatic Truck Retarder insures extra safety!

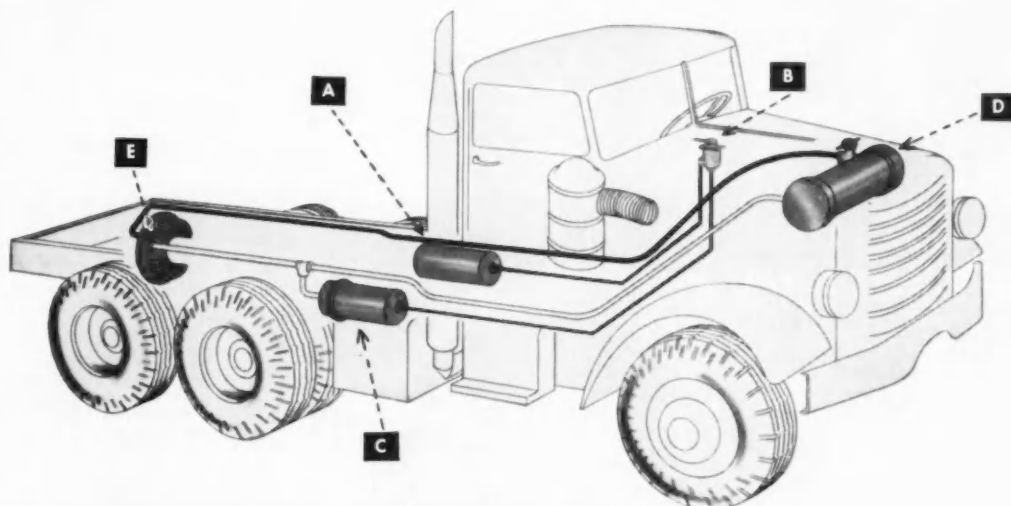
Radical new development means
greater driver-control on highways, hills and
dangerous curves... plus longer truck life

WITH today's higher highway cruising speeds and heavier payloads, Thompson's revolutionary new hydraulic Truck Retarder... light, compact and powerful... now provides an *extra* safety margin for trucks and tractors of any size.

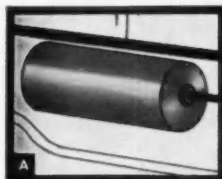
The Thompson Truck Retarder works COMPLETELY INDEPENDENTLY of the vehicle's service and emergency brakes!

The efficiency of a more dependable braking system... due to the use of this Thompson-developed *auxiliary* braking system... means less costly wear and tear on the service and emergency brakes. This results in fewer road breakdowns... less time in repair shops... and lower maintenance costs and longer truck life for truck and fleet owners.

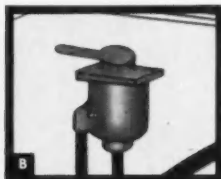
For complete technical information write, wire or phone Michigan Division, Thompson Products, Inc., 34201 Van Dyke, Warren, Michigan.



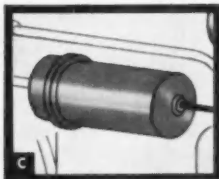
How the Thompson truck retarder works



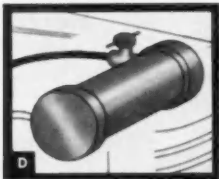
REGULAR AIR SYSTEM supplied on the vehicle also provides the air used by the auxiliary braking system. As an additional safety feature a compressed air reservoir can be applied for emergency use in case the regular air system fails.



CONTROL VALVE, located in the cab and operated by hand, supplies air from the service brake system to the loading cylinder.



LOADING CYLINDER supplies retarder fluid which is forced under varying air pressures to the retarder. When the retarder is not required, fluid is pumped back into loading cylinder.



HEAT EXCHANGER, located within the engine compartment, dissipates the heat through the vehicle's cooling system.



THOMPSON RETARDER—"heart" of the system. Fluid from the loading cylinder strikes against the revolving vanes of the rotor, slowing the vehicle without use of service brakes, leaving them cool for maximum efficiency.

You can count on



Thompson Products

MICHIGAN DIVISION: WARREN AND PORTLAND

Industry News

(Continued from page 118)

Swedish Car Will Be Sold By New Canadian Company

A new company has been formed in British Columbia by the Wenner-Gren Foundation to import and sell a medium-size Swedish car, the Volvo.

The company is Auto Imports (Swedish) Limited, a wholly-owned subsidiary of Wenner-Gren B. C. Development Limited. The latter com-

pany was formed by Swedish millionaire Axel Wenner-Gren as part of a \$1 billion industrial development scheme.

Auto Imports officials said the Volvo will probably sell for \$2,000 to \$2,500.

Boeing Gets Initial Order For IM-99 Bomarc Missile

The Air Force has ordered an initial quantity of IM-99 Bomarc area defense missiles for tactical use from the Boeing Airplane Co.

Announcement of the contract, which totals \$139,315,444, is the first indication that the long secret Bomarc missile may soon be available for the defense of the U. S.

The Bomarc can be equipped with either a conventional or an atomic warhead. Earlier, the missile had been described only as a ground-to-air interceptor missile designed to operate at "extreme" altitudes at supersonic speeds.

Giant Anodizing Machine Dyes Aluminum Any Color

A giant, heavy-duty machine which can permanently dye aluminum any color has been installed at the Firestone Steel Products Co.

The new machine, which can treat 5000 sq ft of aluminum an hour, contains 21 different sequence solutions. Aluminum to be processed is automatically immersed in each solution the correct length of time. Six different finishes can be turned out simultaneously.

While Firestone's anodizing equipment is capable of processing an unlimited number of different finishes, current production is for 1958 passenger car grilles and panel trim in color for popular models in high production. Firestone has manufactured grilles of steel with chrome plating since 1951.

Army Engineers Purchase New Aircooled Engine

Continental Motors Corp. will begin assembly in early October of a new 2-cylinder air-cooled engine for the U. S. Army Corps of Engineers. The engines are part of a six-size family of engines ranging from 1/2 hp to 20 hp.

Continental is producing the engines in its Detroit Kercheval plant, where the company integrates production of its commercial and military engines. Continental is scheduled to complete in late September the first "educational" run of 1000 engines each of the 1/2, 1 1/2 and 3-hp sizes. The machined parts for all engines will be in continuous production, since parts are interchangeable.

The Corps of Engineers developed the engine series to replace the 78 different sizes and types of gasoline engines in use during World War II. The series requires 100 to 200 parts or assemblies in stock, compared with 23,000 spare parts needed for the older engines.

(Turn to page 122, please)



HAUL HEAVIER LOADS

NEW THREE LEVER DESIGN

LIGHTER WEIGHT—SHALLOWER

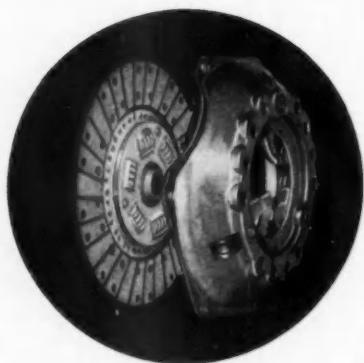
SMOOTHER, QUIETER OPERATION

AVAILABLE IN 10", 10.5", 11" SIZES

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FOR BETTER VENTILATION

SELF ADJUSTING—MINIMUM
MAINTENANCE

DESIGNED FOR HIGH TORQUE ENGINES—
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BORG-WARNER CORPORATION • CHICAGO 38, ILLINOIS



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EXPORT SALES: Borg-Warner International, 36 S. Wabash Ave., Chicago 3, Illinois



THIS INSTRON TESTER measures the energy a tire carcass can absorb before failing. The tests on nylon cord tires proved that nylon's toughness can absorb approximately 2.5 times more energy than ordinary tire cord.

ON THE ROAD, in millions of miles of continuous service on taxi fleets, nylon cord tires have proved their shock-absorbing toughness and superior dependability . . . their capacity to withstand constant flexing and heat buildup.

TEST AFTER TEST PROVES NYLON TIRE CORD GIVES EXTRA TIRE STRENGTH FOR EXTRA SAFETY



Advertising in top magazines will run throughout the year to tell your customers of nylon's lasting ability to shrug off the abuse of "just-around-town" driving and thus offer utmost safety on the highway.

Modern engineering has given us the heaviest, most powerful cars ever to run on superhighways. Motorists need the lasting strength of nylon cord tires—tires able to withstand added strains of today's mile-after-mile sustained-speed driving. Stresses of power steering, power braking and higher horsepowers call for nylon's shock-absorbing toughness. Also, nylon cord tires can reduce unsprung weight.

Nylon cord protects against the four major causes of blowout: heat, moisture, flex fatigue and bruise damage; resists unseen carcass injuries that can seriously weaken tires.

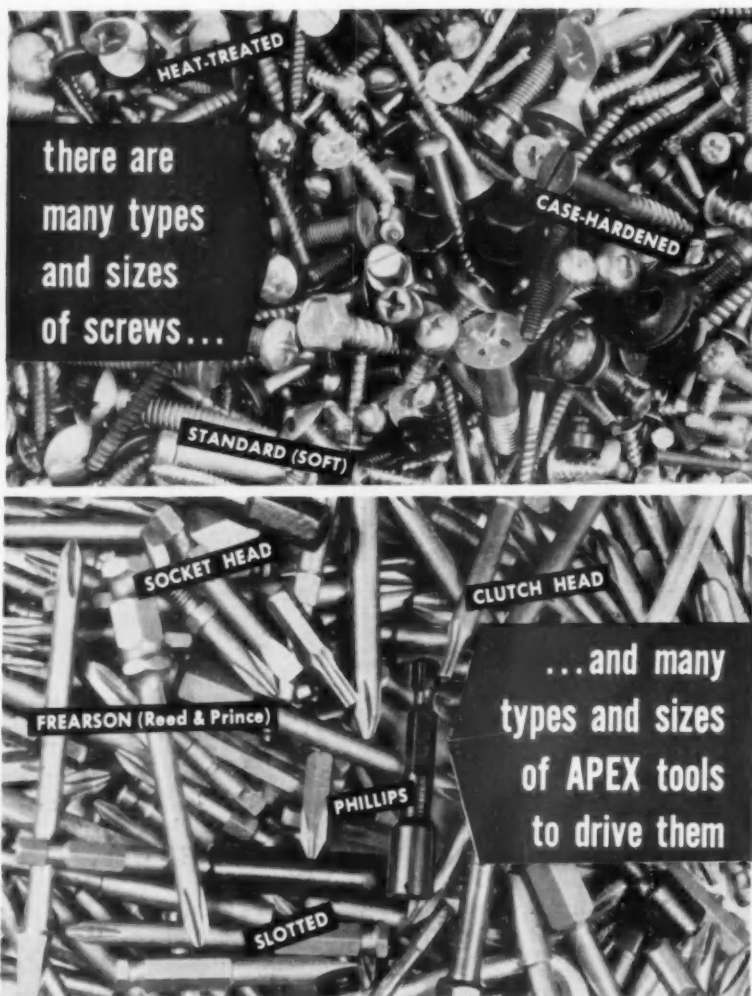
Surveys and rising sales both show that motorists know and want the extra strength and safety of nylon cord tires.

Du Pont produces the nylon fiber.
All tire manufacturers make nylon cord tires.



BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

Today, the strongest, safest tires are made with nylon cord



there are
many types
and sizes
of screws...

...and many
types and sizes
of APEX tools
to drive them

APEX—authority on fastening—offers the most complete range of screwdriving tools, and every one is designed for a specific screwdriving application.

For example, Apex insert bits are available in 18 different heat treatments. Whether you're driving soft screws, heat-treated screws, or case-hardened sheet metal screws, you can select an Apex insert bit exactly suited to your requirements.

If you drive Phillips, Frearson (Reed & Prince), Slotted, Clutch Head or Socket Head screws, you can reduce your fastening costs with Apex Screwdriving Tools. For complete information, write, on your company letterhead please, for Catalog 25 (Magnetic Tools) or Catalog 21 (Standard Tools).

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PHILADELPHIA • PITTSBURGH • PROVIDENCE • ROCKFORD • ST. LOUIS • SEATTLE
SHREVEPORT • SOUTH BEND • SYRACUSE • WICHITA

Industry News

(Continued from page 120)

New Lincoln Plant in Michigan Has 30-Car-Per-Hour Capacity

At a press preview recently, a group of editors toured Lincoln's new 1,374,000 sq ft plant at Wixom, Mich. The two-story facility is designed for a capacity of 30 cars an hour, with provision for future expansion in any direction.

In the new plant, body framing is handled in a one-stage buck system, with all the preliminary welding done on the entire shell while it is clamped in the massive fixture.

The new Lincoln body requires 3300 spot welds, compared with 2205 for the 1957 body shell. Because of the heavier gage sheet metal used in the new body, 150-kva welding guns are required.

Air-powered tools are used exclusively. In all, the plant is equipped with about 1200 air tools, including some five-spindle multiple nut runners for attaching wheels on the assembly line.

Plants in Three Countries Are Assembling Edsel Cars

Edsel cars are being assembled in Ford Motor Co. plants in Canada, Mexico and Belgium. The plant at Oakville, Ont. is assembling for Canada and sterling market countries. Engines and other key components are built at Windsor and shipped to Oakville.

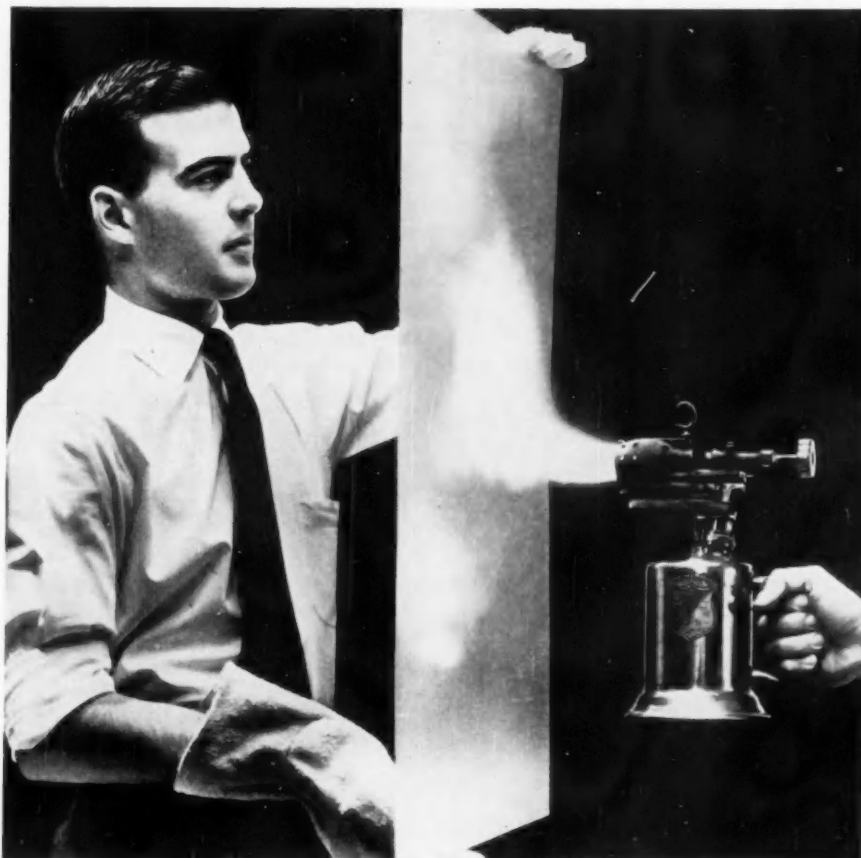
The Antwerp plant is building for Belgium, France, The Netherlands, and Switzerland. Production at the Mexico City plant is for the Mexican market.

Edsel dealers in other countries will receive built-up units from U. S. plants. No station wagons or convertibles are being assembled overseas.

Edsel Citation and Corsair models are shipped from the Mahwah, N. J. plant, and the Pacer and Ranger are shipped from Somerville, Mass.

Record Sales and Earnings Reported by Goodyear Tire

Goodyear Tire & Rubber Co. reported record sales and earnings for the first six months of 1957, with sales up 5.5 per cent and net income up 17 per cent. Sales were \$721,035,882 compared with last year's \$683,066,058. Earnings rose from \$30,655,683 a year ago to \$35,943,585.



The 1200 F flame of a blowtorch causes no destructive heat scaling on Armco ALUMINIZED STEEL Type 1. This is why it provides long-time protection against corrosive attacks from heat and combustion products in automobile mufflers.

Mufflers made of Armco ALUMINIZED STEEL Defy Destructive Heat Scaling

Increased exhaust temperatures from today's high compression engines soon eat through ordinary cold-rolled steel mufflers. The result is customer dissatisfaction and dealer problems. You can prevent this by equipping your cars with mufflers made of Armco ALUMINIZED STEEL® Type 1.

This specially hot-dipped aluminum-coated steel resists destructive heat scaling up to 1250 F. Furthermore, the aluminum coating protects the

base metal against attack from corrosive products of combustion.

Proved by Test

Seven-year road tests under actual operating conditions show that mufflers made of Armco ALUMINIZED STEEL outlast uncoated cold-rolled steel mufflers at least two to one. Over 95 per cent of the ALUMINIZED STEEL mufflers were still giving good service after 24 months' operations. This

means that ALUMINIZED STEEL should greatly reduce failures during the period of first ownership.

Because increased replacement costs have made new car owners especially conscious of muffler life, longer-lasting ALUMINIZED STEEL mufflers provide your dealers with an important sales advantage.

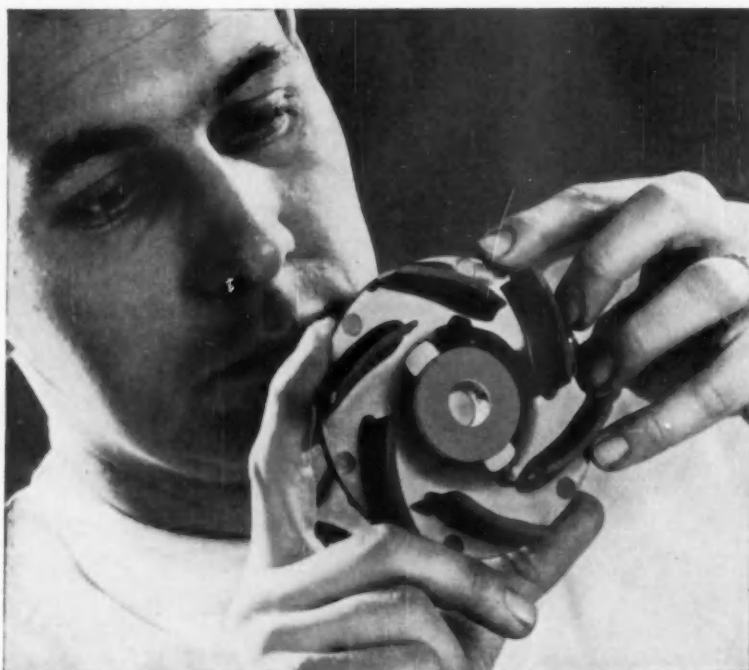
For complete information on Armco ALUMINIZED STEEL Type 1, just write us at the address below.

ARMCO STEEL CORPORATION

2197 CURTIS STREET, MIDDLETOWN, OHIO

SHEFFIELD STEEL DIVISION • ARMCO DRAINAGE & METAL PRODUCTS, INC. • THE ARMCO INTERNATIONAL CORPORATION





Where else can **DUREZ PHENOLICS** do the job best ?

For more than 20 years the water pump impeller of molded phenolic plastic has proved so dependable that most car owners never hear of it. Dimensionally stable, impervious to anti-freeze and anti-rust solutions, it performs like new for the life of the vehicle.

In your continuing search for new and better materials, lower unit cost, faster assembly, and longer wear, have you investigated the properties that

make Durez phenolics outstanding for many automotive components? Electrically non-conductive and chemically inert, they withstand heat and impact in high degree, mold readily to any shape, and need little or no finishing.

New thermosetting plastics developed by Durez with glass fiber and other reinforcing fillers offer these properties in remarkable combinations. Check with your custom molder or call on our field service for help.

OUTSTANDING PROPERTIES OF PHENOLICS INCLUDE:

- Dimensional stability
- Non-conductivity
- Resistance to heat and cold
- Impact strength
- Resistance to moisture
- Chemical resistance
- Moldability in intricate shapes
- Moderate cost



® Phenolic Plastics that Fit the Job

DUREZ PLASTICS DIVISION

HOOKER ELECTROCHEMICAL COMPANY
2009 Walck Road, North Tonawanda, N. Y.



Automotive Finishes

(Continued from page 115)

1945-1956—Waiting for the New Models

No major progress was made during the war years, but their austerity stimulated dreams of the post-war cars. Aside from mechanical innovations, color was desired: a rainbow of pastel shades and two- and three-tone effects in light, bright tones. This demand for color had probably always been real but not until the last 15 or 20 years did engineers have pigments and binders of the necessary quality available.

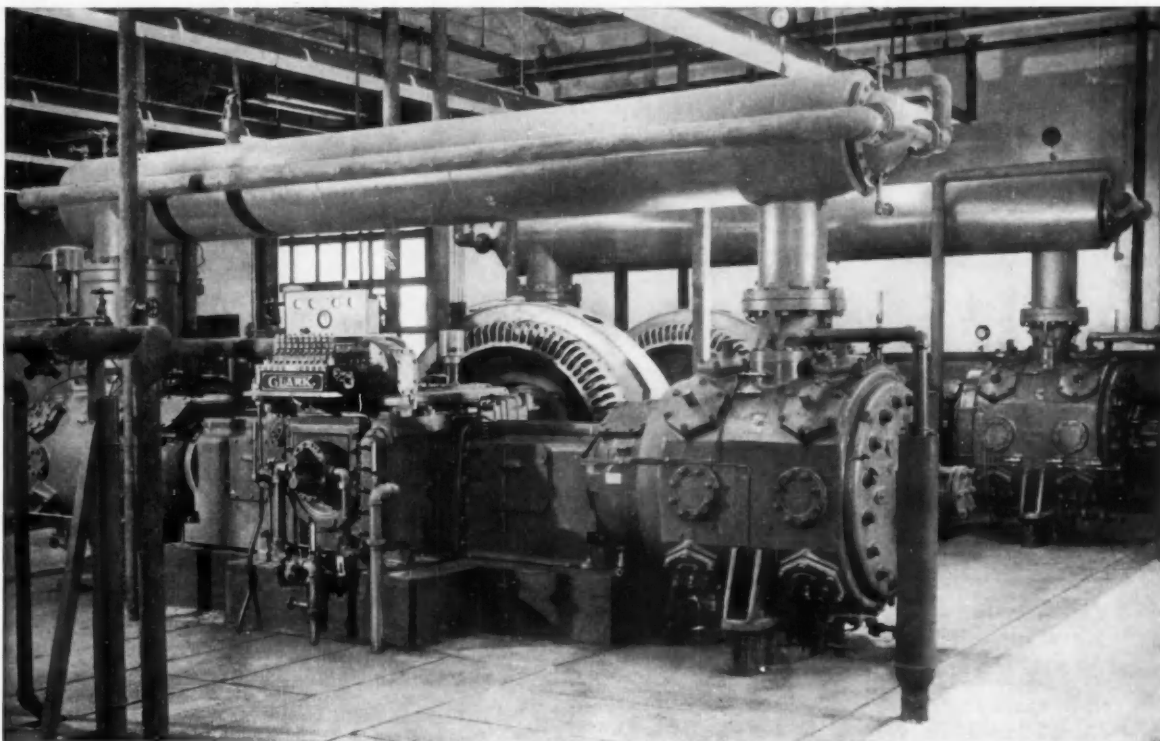
The trend towards high visibility tints and brighter colors of deeper hue grew by leaps and bounds. Stronger pigments, such as phthalocyanine blue and green, were introduced. Flake aluminum was used as an additive to the enamels to produce a metallic sheen. Melamine-formaldehyde resin replaced urea resin in combination with alkyd because melamine-alkyd mixtures exhibited improved resistance to water, moisture and weather.

Rigorous control of the physical properties of pigments for automotive finishing became more important as the quality demands on finishes increased. Such properties as durability, gloss retention, bronze resistance, chalk resistance, transparency and compatibility with binders, while dependent on the binder, are also dependent on the physical and chemical form of the pigment used.

1956—More Cars— More Problems

As mass production became an integral part of the automobile industry, both production control and production repair became increasingly complicated. Not only were various parts of each car painted at different times on different lines, but these applications might even take place in different plants.

Alkyds based on soybean oil have a tendency to yellow during the baking schedule—particularly



What Jules Verne couldn't foresee!



Around the world, 24,325 miles of it, in 45 hours and 19 minutes...our strategic B-52 bombers did it non-stop! This speedy trip made Jules Verne's "80 days" seem like a lifetime. Part of the B-52 — the electrical pneumatic units that drive generators to provide the muscle for operating flaps, gun turrets, radar and countless other operations are provided by Thompson Products, Inc. of Cleveland, Ohio. Four of these 205 horsepower units go into every B-52. To be certain they are perfect, Thompson gives them a thorough test before shipment. One 350 horsepower Clark CMA-4 and two Clark 600 horsepower CRA-2 air compressors furnish the air for testing.

There is a vibrationless Clark balanced/opposed compressor for practically every requirement. Sizes range up to 6000 horsepower. Your nearest Clark representative has all the facts.

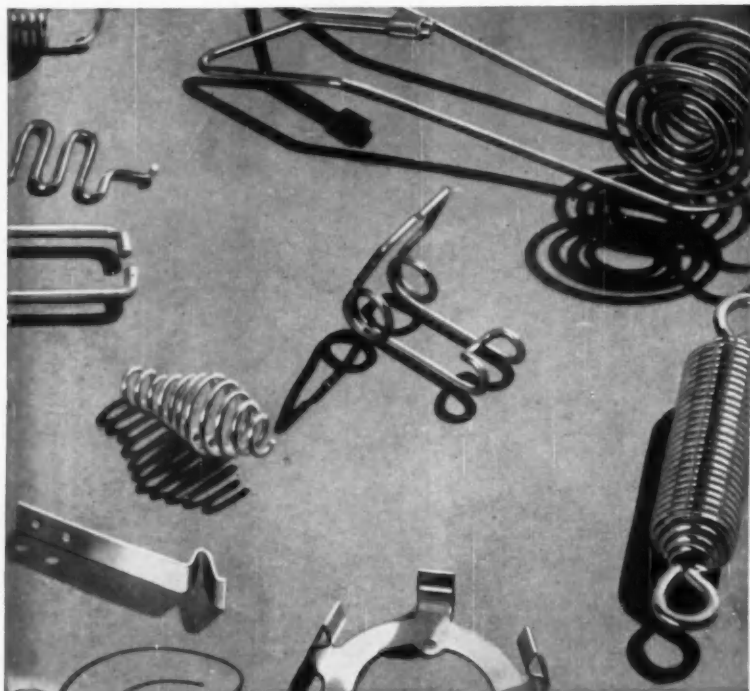
CLARK BROS. CO. OLEAN, NEW YORK

One of the Dresser Industries

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**Balanced/Opposed
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Springs by the Millions

Accurate makes springs by the millions—many of our customers use a million a month. That takes a lot of spring know-how, experience and skill. But to produce precision springs in large quantities at nominal cost takes more than that. It takes imagination.

Imagination allows Accurate to approach problems without being too influenced by conventional methods. To successfully produce large quantities of precision springs Accurate customer service begins in the design and engineering stage. Highly developed skill in producing special tooling for large quantities often helps lower overall cost. Springs held to close tolerances are assured by rigid quality control and inspection. Packaging is designed to provide ease of handling and speed the customers' production. Scheduling and planning departments assure quantities delivered to meet your needs and reduce inventory requirements.

That is the type of experience, skill . . . and imagination, that allows Accurate to produce springs by the millions. Plan your springs with Accurate too.

ACCURATE SPRING MANUFACTURING COMPANY

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if the cycle has been extended. This meant if there were a difference in baking time on different car parts, the lighter pastel shades varied in tone when the parts were assembled.

An even weightier problem was the temporary stoppage of one line while a part was being baked—with the result that the over-baked part took on a burned yellow or a brown tint. Paint chemists worked overtime on the solution—and came up with two new products.

One is an acrylic lacquer based on poly-methyl methacrylate and containing a phthalic ester plasticizer. It is applied in two or three coats and usually baked for an hour at 180 F. The acrylic resin offers excellent color potentials, color retention, gloss and gloss-retention. It lacks some adhesion and flexibility but this is remedied by the use of undercoats based on epoxy resins. Although new acrylic resins have not fully replaced the nitrocellulose lacquers, this is a possibility.

The second new type of finish is based on non-oxidizing (or non-drying) alkyds for enamels, such as those manufactured with coconut oil or synthetic unsaturated fatty acids (perargonic acid or 2-ethyl-hexanoic acid) blended with 25-30 per cent melamine resin.

1960—The Crystal Ball

The almost water-white non-drying alkyd resins have been used for some time for white appliance enamels. Their use in enamels of the lightest pastel shades is assured because they offer excellent color, outstanding color retention and great durability. Adhesion might well be improved but flexibility and brittleness are not problems. Both the acrylic and the new high-melamine non-drying alkyd finishes open the door for future growth in color ranges.

In the immediate future, attention will focus chiefly on improvement of these finishes. It is possible, for example, that the alkyd resin might be used to modify the acrylic resin—to obtain the best properties of each of these excellent materials.

(Turn to page 130, please)



cool metal for hot planes

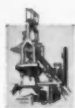
For jet and rocket aircraft engines, wings and surfaces that are subject to extreme conditions of heat, friction and corrosion, where the metal *must stand up* . . . design it, improve it and protect it with McLOUTH STAINLESS STEEL.

specify

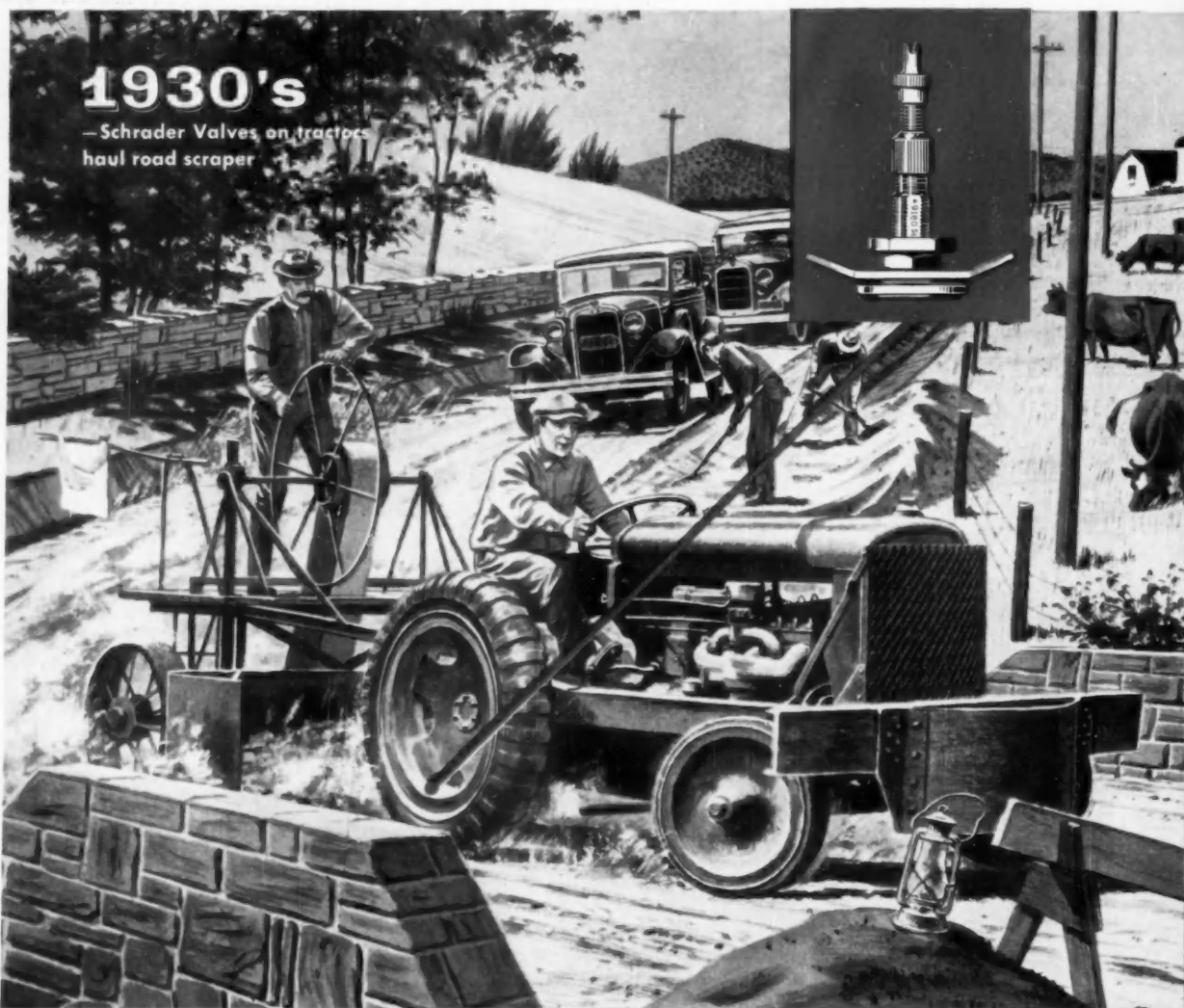
McLOUTH STAINLESS STEEL

HIGH QUALITY SHEET AND STRIP

for aircraft

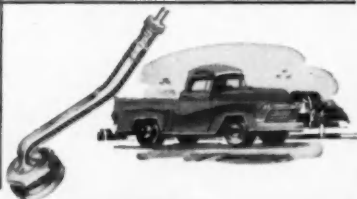
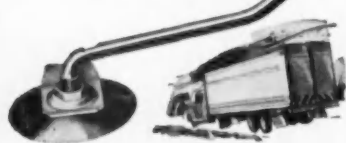


McLOUTH STEEL CORPORATION DETROIT, MICHIGAN
MANUFACTURERS OF STAINLESS AND CARBON STEELS



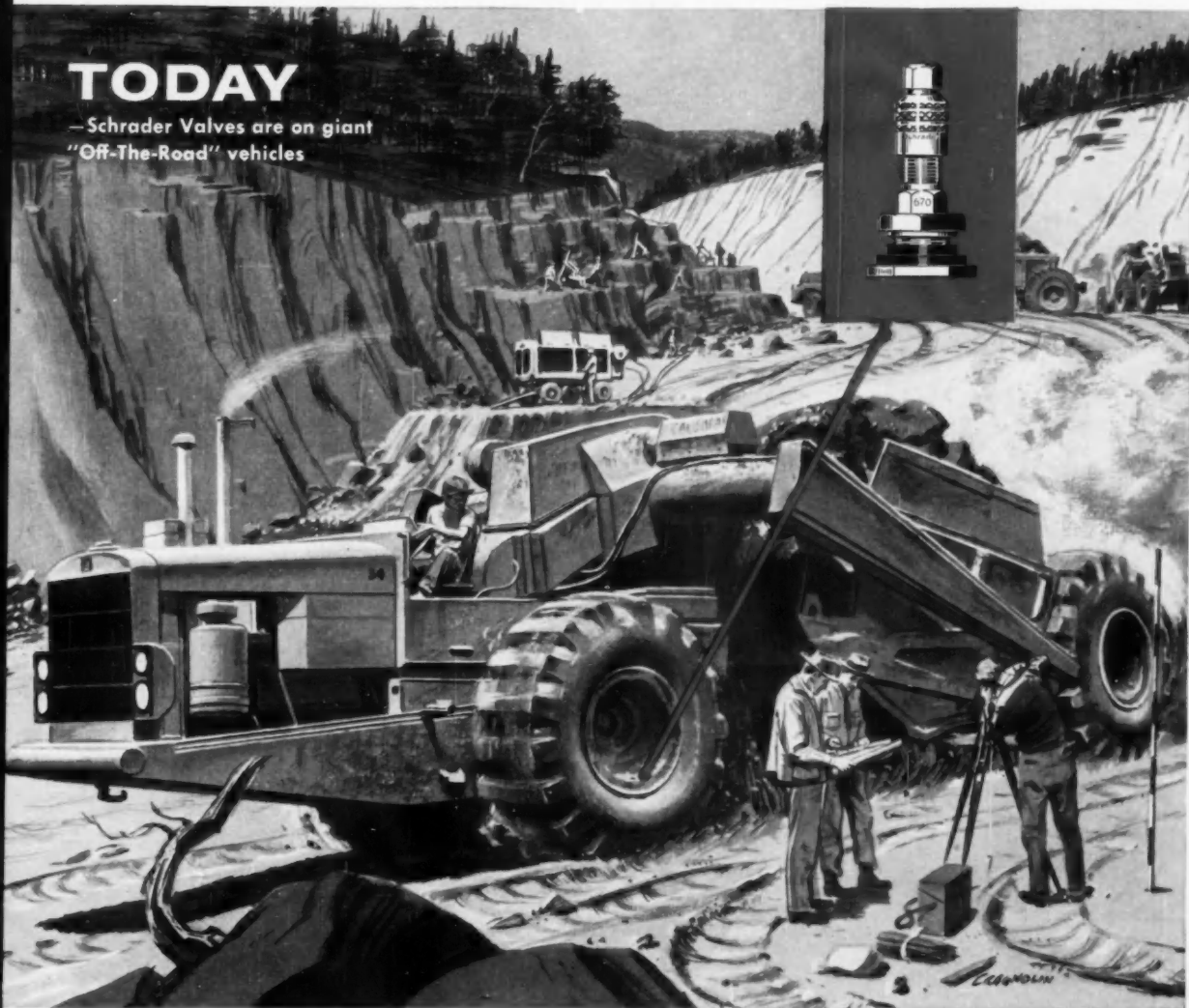
OUTSTANDING TIRE

Quality Schrader Tire Valves keep rolling up the miles with every type of vehicle



TODAY

—Schrader Valves are on giant
"Off-The-Road" vehicles



VALVE PERFORMANCE: why can everyone count on it?

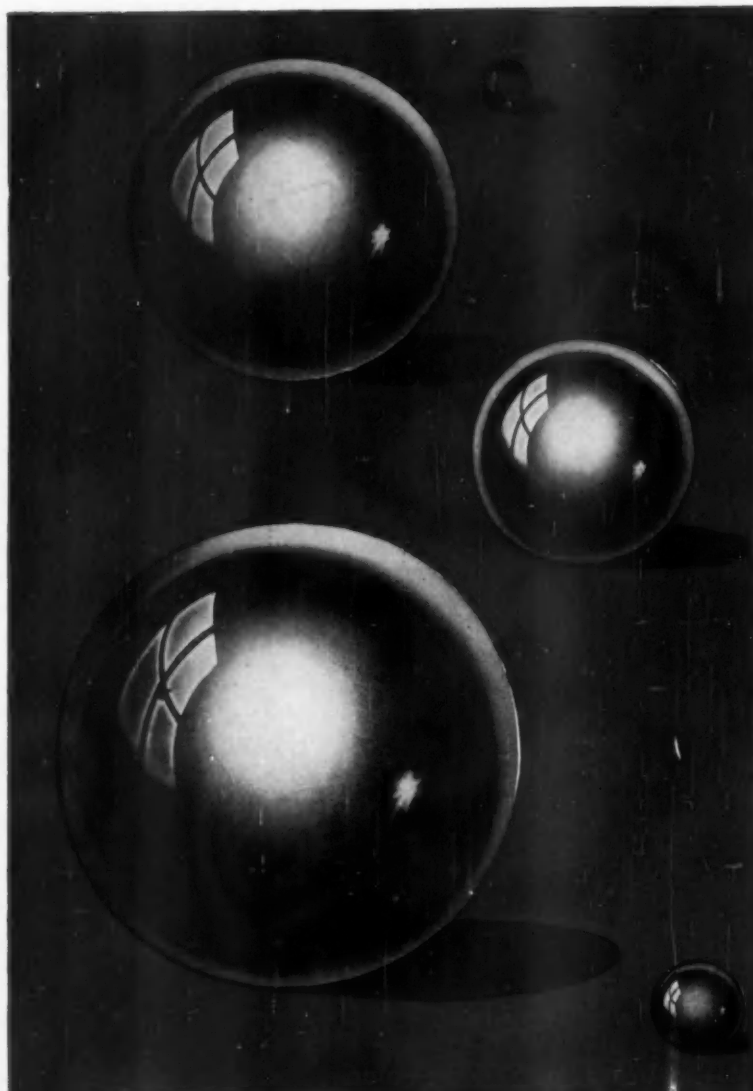
The answer is Industry cooperation. Everyone concerned with vehicles works together, pooling skills and technical research. Schrader uses this pooled experience, plus Schrader's own specialized capabilities to produce valves that have always performed so well everywhere in the world. Whether quantities involved are ten or ten million, Schrader gives expert attention to every problem: original installation, stocking, dealer replacement practices . . . service at the user level. You can count on Schrader Valves for best performance on any or all your vehicles.

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COOLIDGE *Balls*

CHROME ALLOY AND STAINLESS

**COOLIDGE CORPORATION
MIDDLETOWN, OHIO**

Automotive Finishes

(Continued from page 126)

A number of new materials, too, are under investigation. Research is being conducted in polyurethane resins with an eye to their excellent adhesion, hardness, durability and chemical and corrosion resistance. Coatings able to withstand accident impact without repainting are distinct possibilities. The epoxy resins offer flexibility, adhesion and moisture-resistance and may find use as undercoats. Silicone-alkyd resins also may be utilized to extend durability of automobile finishes to several times their present life.

Interesting possibilities include methods of applications. For instance, it is common practice in the toy industry to post-form parts after they have been roller-coated or lithographed. While this may not be practical for the car body, it may offer some advantages for component parts—fenders, hoods and trunk decks. Here we should consider the possibility that some future date may bring floral patterns, mosaic designs or simulated wallpaper decorations to automobile interiors—and exteriors.

Flow-coating and dip-coating may become practical—the latter is already utilized to finish small parts in other fields. High frequency radar cooking is an established fact and may conceivably be utilized by the automotive industry to reduce baking schedules to two or three minutes.

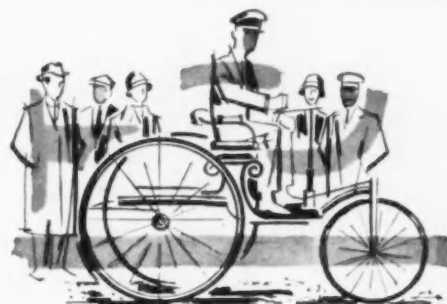
The ideal pigment for automotive use will be of maximum tinctorial intensity and of high strength. High hiding is desirable for solid colors, high transparency for metalized shades. This ideal pigment will be permanent to light and durable to weathering in any surface coating. It will be soft textured, that is, easy to disperse and free of objectionable thixotropy or bodying tendencies when ground in a binder. It should not adversely affect gloss of a finish either initially or on weathering and should be non-bleeding in solvents and resistant to change either by chemical or physical reactions.

Very few known pigments have

MILESTONES IN POWER PROGRESS

(NO. 1 IN A SERIES)

1885 — The first internal-combustion engine car —
by Benz



**1955 — The first creative-packaging of dry-charged batteries
was introduced by GLOBE**

Historians disagree on the absolute birth-day of modern motoring, but Karl Benz did build the first internal-combustion engine car. And there's no argument at all about Globe's *battery* contributions . . . not only pioneering dry-charged batteries, but first to package all elements *together* for the simplest, swiftest battery activation ever known.

It's this fast, this easy, this important . .



Open the compact carton, a complete package of charging ingredients • Take out each plastic bottle of *pre-measured* Spinning Power electrolyte — no waste, no guesswork, no time out to measure • For extra safety slip each bottle into the handy pouring sleeve • Your grip is firm as you snip the bottle nipple and — *Pour!* Battery is ready for action with *fresh power*. Because until that instant the battery has been inert — and because *method and ingredients are all together in one package*.

Another milestone in power — another **first** for Globe!



GLOBE-UNION INC.

MILWAUKEE 1, WISCONSIN

First for fast, low-cost delivery too!

Lightweight plastic electrolyte bottles and compact carton cut shipping costs. Furthermore, Globe's sixteen plants are strategically located for fastest, lowest-cost shipments to all markets — and thirteen (*) are producing dry-charged batteries.

*ATLANTA, GA., *DALLAS, TEXAS, *EMPORIA, KANSAS,
*HOUSTON, TEXAS, *LOUISVILLE, KY., *MEDFORD, MASS.,
*MEMPHIS, TENN., *MILWAUKEE, WIS., *MINERAL RIDGE, OHIO,
*PHILADELPHIA, PA., *REIDSVILLE, NO. CAROLINA, *SAN JOSE,
CALIF., *HASTINGS-ON-HUDSON, N. Y., LOS ANGELES, CALIF.,
OREGON CITY, ORE., AJAX (ONTARIO) CANADA

If it's Petroleum-powered there's a **GLOBE-BUILT BATTERY** right from the start!

all these ideal qualities. The closest approach is offered by the phthalocyanine colors, developed rapidly by intensive research.

Credit: Material for the above supplied by: Pigments Dept., E. I. du Pont de Nemours & Co., Wilmington, Del.; The De Vilbiss Co., Toledo, Ohio; and Jones Dabney Co., Louisville, Ky.

New Device for Control of Vehicle Speed

(Continued from page 96)

about \$75 to \$100 installed as optional equipment. It is mounted on the firewall by means of a bracket, and the connections to the

car's driving mechanism are not difficult to make. It is packed in grease and sealed against dust, and would require no lubrication

nor maintenance unless it ceased to operate.

Installation on present cars is not mechanically difficult, but there is little chance of preparing standard attaching pieces for all the makes and models of cars now on the road. Standard kits might later be made up to fit the control device to certain late-model cars. The company expects to begin volume production Oct. 1 at a special plant in Hagerstown, Ind., which is now being tooled up.

Depend on EUREKA RADIATORS for RUGGED ENDURANCE & MAXIMUM COOLING

HONEYCOMB V-CELL TYPE

DIAMOND TYPE

TUBULAR "N" TYPE
3/32" x 3/4"
Tubes on 5/8" Centers

TUBULAR "F" TYPE
3/32" x 3/4"
Tubes on 7/16" Centers

EUREKA

OVER 30 YEARS OF SPECIALIZATION

For over 30 years, EUREKA Cores and Radiators have served the automotive industry with utmost dependability. Our facilities, equipment, and personnel are available for your needs. We welcome the opportunity of integrating our specialized skills with your needs to help you achieve a well-planned production schedule.

What are your requirements? We can build Radiators to your order in any type, to any size or shape. Send us your blueprints for prompt quotations!



EUREKA RADIATORS AND CORES
for CARS, TRUCKS, TRACTORS and SPECIAL APPLICATIONS.

AUTO RADIATOR Manufacturing Co.

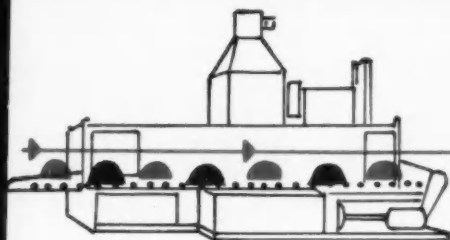
Guaranteed Radiator Cores Since 1915
2901-17 INDIANA AVE. CHICAGO 16, ILLINOIS

The BUSINESS PULSE

(Continued from page 98)

sumer expenditures for goods since March. Consecutive increases are shown for all months beginning in April, with the preliminary estimate for July almost 4 per cent above the March figure. Federal Reserve data on department store sales show a similar pattern, but even so it is difficult to be certain just what the underlying trend of retail trade is at present. It will be important to see what reconciliations are made in official statistics in future months.

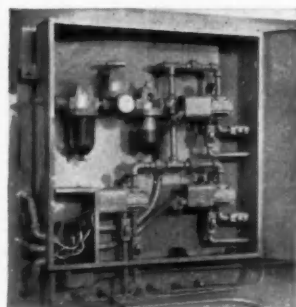
With respect to the stock market itself, there has been considerable belief for some time that stocks were being purchased by many as a hedge against the possibility of long-term inflation. If this has been true to any significant extent, it may be that recent developments of a monetary nature have been a negative stock-market influence. The advance in the rediscount rates of all Federal Reserve banks from 3 to 3½ per cent during August was a telling rejoinder to those who have asserted that Federal Reserve policy was likely to soften as a consequence of the widespread attack that has been directed against it this year. And the very pointed emphasis which William McChesney Martin, chairman of the Federal Reserve Board, put upon the need for preventing even "creeping" inflation over the long term in his testimony before the Senate Finance Committee tended to cast doubt upon the validity of the assumption of extended inflation as a working hypothesis.



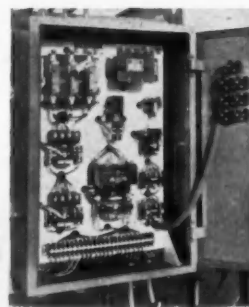
Automated

3-STAGE WASHER

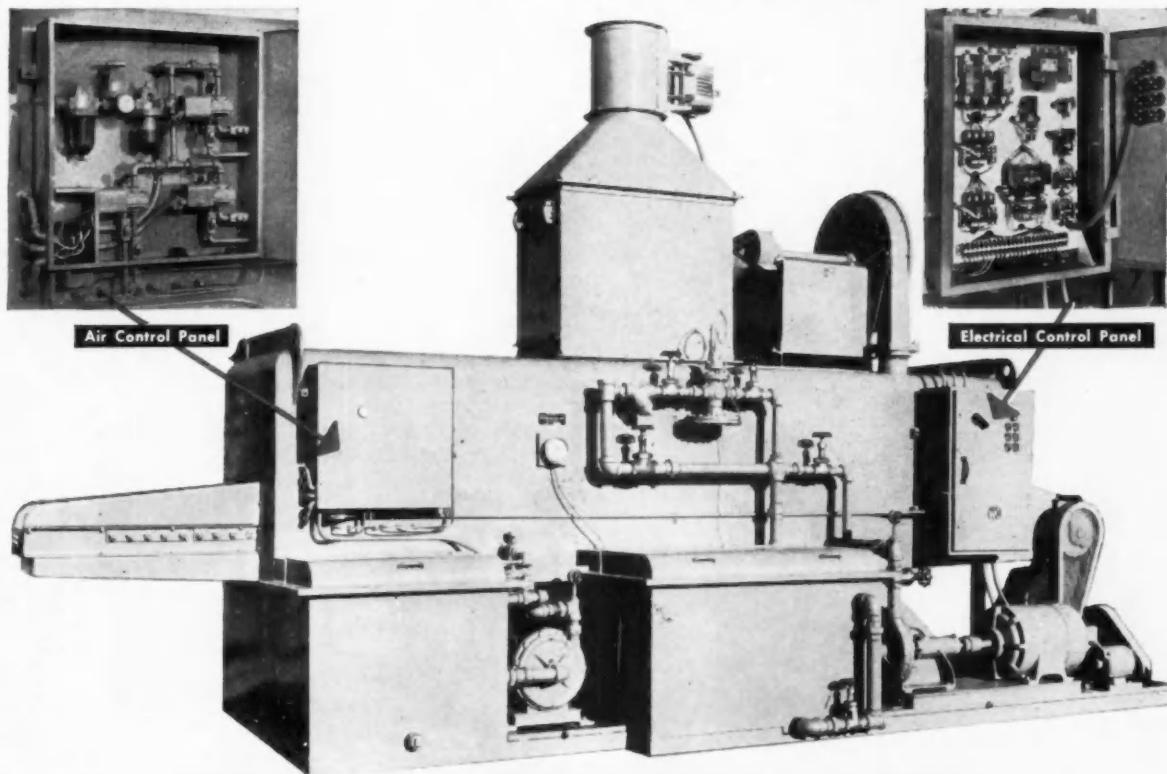
by PETERS-DALTON



Air Control Panel



Electrical Control Panel



P-D 3-STAGE WASHER FOR TORQUE CONVERTER HOUSINGS

Important savings of time and labor, along with efficient and economical operation, have been made possible through this 3-Stage Washer designed, engineered, built and installed by Peters-Dalton. Its function is to spray-wash both the inside and outside of torque converter housings. The operation is performed in a continuous action—first, the housings are fed to the machine on gravity rolls; then an air cylinder moves them over the inside spray manifold. This same motion holds back the unit following and moves the preceding unit onto a cross-rod conveyor for outside wash. Another cylinder positions each unit over the manifold and blocks the shaft opening. The inside and outside wash are both heated emulsified oil cleaners—room air blow-off removes excess oil. The exhaust has an eliminator and a filter box for entrapping overspray.

Whatever your requirements, finishing equipment to meet every need regardless of size, can be designed, engineered and manufactured by Peters-Dalton to perform efficiently and economically. The knowledge gained through more than a quarter century of designing, engineering and custom manufacturing, is available to you at P-D. Why not send us your specifications or prints? Our reply will be prompt. Just write, wire or phone . . . we'll be glad to tell you more.

Representatives in principal cities.

- P_D** Hydro-Whirl Paint Spray Booths
- P_D** Industrial Washing Equipment
- P_D** Drying and Baking Ovens
- P_D** Hydro-Whirl Dust Collecting Systems



Peters-Dalton INC.

A SUBSIDIARY OF DETROIT HARVESTER CO.

17930 Ryan Road • Detroit 12, Michigan

More Government Contract Awards

LATEST contracts awarded by various Government agencies, and covering primarily automotive and aviation products, are listed in the following. Typical of the items contained in these monthly listings are: passenger cars, motor trucks, aircraft, military tanks, engines, transmissions, other components, spare parts, etc. This list is for the period July 31 to August 28, inclusive.

BAKER RAULANG CO., Cleveland, Ohio
Truck, fork lift, gasoline driven, 4000 lb cap., dual drive wheels—6; "O" kits consisting of motors, parts—6—\$31,698

BENDIX AVIATION CORP., Pacific Div., North Hollywood, Calif.
Pumps—160—\$45,344

Valve assemblies—various—\$41,352

BENDIX AVIATION CORP., South Bend, Ind.
Wheel assemblies—524—\$146,347

BENDIX AVIATION CORP., Utica, N. Y.
Wheels—\$40,927

BOEING AIRPLANE CO., Seattle, Wash.
Implementation of FY 1958 model improved B-52 program—\$10,000,000
Supplies and services for overhaul, repair or modification of 502 series engines—\$80,000

BOEING AIRPLANE CO., Wichita, Kans.
Implementation of FY 1958 MI B-52 program—\$12,000,000

CARDOX CORP., Chicago, Ill.
Type O-6 aircraft fire fighting and rescue truck—35—\$1,255,068

CHRYSLER MOTORS CORP., Washington, D. C.
Trucks—22—\$52,399

CONSOLIDATED DIESEL ELECTRIC CORP., Stamford, Conn.
Gen. set, gasoline engine driven—590—\$4,812,040

CONTINENTAL MOTORS CORP., Detroit, Mich.
Engine-generator sets, 1½ kw—\$111,955
20 HP engines and parts—9—\$224,948

CONTINENTAL MOTORS CORP., Muskegon, Mich.
Spare parts—7274—\$186,728

CUMMINS ENGINE CO., Columbus, Ind.
Generators—7—\$34,772

CURTISS-WRIGHT CORP., Wood-Ridge, N. J.
Overhaul of J-65 series aircraft engines—300—\$1,707,000

DANA CORP., Toledo, Ohio
Shaft assy., propeller rear w/universal joints assy.—5845—\$63,184

DOUGLAS AIRCRAFT CO., Santa Monica, Calif.
Missile technical representative services—\$1,670,064

ELECTRICAL ENGINEERING & MFG. CORP., Los Angeles, Calif.
Aircraft accessory spare parts—51—\$102,189

ELECTRO MECHANICAL PRODUCTS COMPANY, Garden City, Mich.
Automotive spare parts—800—\$27,840

FORD MOTOR CO., Ford Div., Washington, D. C.
Automobiles—42—\$76,340
Trucks—19—\$33,213

GENERAL ELECTRIC CO., Evandale, Ohio
Overhaul of J47-GE-13, J47-GE-17B/33 and J47-GE-23 turbo-jet engines—\$2,402,648

GENERAL MOTORS CORP., East Pontiac, Mich.
Automotive spare parts—10,440—\$30,485

GENERAL MOTORS CORP., AC Spark Plug Div., Flint, Mich.
Automotive spare parts—6874—\$37,532

GENERAL MOTORS CORP., Aeroproductions Operations, Dayton, Ohio
Actuators—72—\$114,840

GENERAL MOTORS CORP., Chevrolet Motor Div., Detroit, Mich.
Trucks—13—\$20,381

GENERAL MOTORS CORP., Foreign Dist. Div., New York, N. Y.
Automobiles—9—\$11,430
Trucks—8—\$12,610

GENERAL MOTORS CORP., GMC Truck & Coach Div., Pontiac, Mich.
Truck-tractor—2—\$12,670

GENERAL MOTORS CORP., United Motors Service Div., Detroit, Mich.
Spare parts—5016—\$136,285

B. F. GOODRICH CO., B. F. Goodrich Aviation Products, Akron, Ohio
Wheel & Brake assys.—\$105,843

GRUMMAN AIRCRAFT ENGINEERING CORP., Long Island, N. Y.
Parts for F9F, F6F and AF spares—various—\$25,254

(Turn to page 136, please)



Johnson TAPPETS

Johnson Hydraulic Tappets are dependable and are of the highest quality, both in materials and in workmanship.

Johnson also makes a variety of other styles of tappets, barrel type and mushroom, of various materials, to suit the requirements of your engines.

Let us assist you in the development of the tappets for your new engines.

"Tappets are our business"

JOHNSON PRODUCTS INC.

MUSKEGON, MICHIGAN

HERE'S
AN EXCITING
GAME



PUT your products in the barrel TAKE your profits out

A great way to save money is to barrel finish metal parts by the hundred instead of manually finishing one part at a time.

Next time a job of grinding, deburring or buffing proves too costly on a wheel, try it in a barrel. The results are often so surprising that barrel finishing becomes an exciting and profitable game.

One Oakite customer changed to barrel methods to deburr curved stainless steel strips that are 14 inches long.

The cost for deburring 20,000 strips was reduced from \$3,000 to \$125.

FREE For a copy of "Precision Barrel Finishing" write to Oakite Products, Inc., 28A Rector St., New York 6, N. Y.



Technical Service Representatives in Principal Cities
of U.S. and Canada

Export Division Cable Address: Oakite

(Continued from page 134)

HAYES AIRCRAFT CORP., Birmingham, Ala.

Modification of B-50 aircraft to KB-50, IRAN thereof, incidental maintenance thereto—\$8,915,379

HOLLEY CARBURETOR CO., Van Dyke, Mich.

Automotive spare parts—1876—\$120,608

JOHN K. HOLLINGSWORTH CORP., Clifton Heights, Pa.

Engine generator sets—\$90,140

INTERNATIONAL HARVESTER CO., Washington, D. C.

Truck, maintenance services, utility, 8700 GVW, 4 x 4, with 55 cfm compressor, 2—same except 125 cfm compressor, 2—same except 300 amp arc welder, 2—\$45,656
Trucks—6—\$14,559

INTERNATIONAL HARVESTER EXPORT CO., Chicago, Ill.

Trucks—9—\$19,324

LIBBY WELDING CO., INC., Kansas City, Mo.

Generator set, Diesel engine, trailer mounted, 40 kw—22—(Est.) \$71,142

MARMON-HERRINGTON CO., INC., Indianapolis, Ind.

Type MB-5 aircraft fire fighting trucks—69—\$1,045,797

MOHAWK RUBBER CO., Akron, Ohio

Tire, 12.00 x 20, 14 PR, T&B, M&S—1046—\$79,485

PIERCE GOVERNOR CO., INC., Anderson, Ind.

Aircraft accessory spare parts—\$123,256

PRATT AND WHITNEY CO., INC., Chandler-Evans Div., West Hartford, Conn.

Overhaul of fuel control assemblies—Job—\$266,359

ROYAL JET, INC., Alhambra, Calif.

320 gal external jettisonable fuel tanks for B-57 aircraft—1050—\$746,434; tank assemblies, 275 gal for F-100 aircraft—3717—\$2,056,616

STEWART-WARNER CORP., Chicago, Ill.

Gage fuel assy. (luminous)—29,680—\$78,533

O. A. SUTTON CORP., Wichita, Kans.

Tank assemblies, 275 gal for F-100 aircraft—3717—\$2,046,073

UNITED STATES RUBBER CO., Fisk Tires Div., Detroit, Mich.

Tire, 7.50 x 20, 8 PR, T&B, M&S, ND—104,200; tube, 7.50 x 20, T&B, TR—177A—36,800—\$2,190,894

UTICA-BEND CORP., Utica, Mich.

Trucks, 2½ ton, 6 x 6, M44 series—various—\$25,300,000

RAY WHYTE ELECTRIC PRODUCTS, Centerline, Mich.

Automotive spare parts—50,534—\$80,632

WILLYS-MOTORS, INC., Toledo, Ohio

Additional procurement of engines w/accessories, gear driven, 2-8—\$210,935

Trucks, jeep, and spare parts—12—\$25,280

Pickup trucks—172—\$345,425

Trucks—7—\$14,428

YANKEE MOTOR BODIES CORP., Los Angeles, Calif.

Truck, aircraft rescue & fire fighting—1—\$47,104

Century

now factory standard
on new

DIAMOND T

Model 831 LPG Trucks



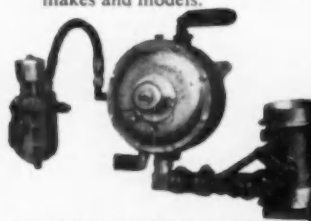
Important advantages are gained by standardizing on Century 3C carburetion. Easy starting, smooth idling, constant power and speed, superior performance, and maximum economy in any service are assured. Each carburetor employs Century's exclusive metering valve system which is factory-calibrated and preset to the performance curve of the engine, to provide ideal fuel-air mixtures for all operating conditions.

Performance is not affected by changes in temperature or altitude.

Selected as standard on Diamond T Model 831 LPG trucks is the Century 2½ inch single throat carburetor with built-in Holley governor, a Model K-4 converter, and a 12-volt filter-fuelock.

Century carburetors for conversion or replacement are available for all makes and models.

Write for complete information today.

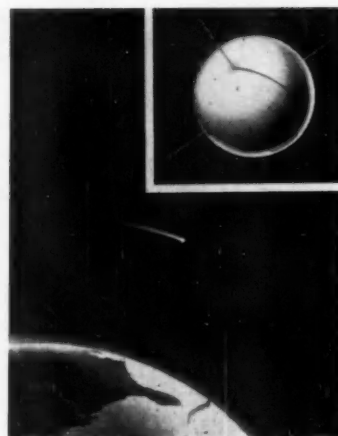


CENTURY GAS EQUIPMENT CO.
6855 E. Rosecrans Ave.
Paramount, Calif.

CENTURY

LP-GAS CARBURETION

MAGNESIUM SATELLITE



Shown here is an artist's conception of the satellite to be sent probing next year into the secrets of outer space. It will be made of magnesium rugged enough to be fired from giant rockets. Brooks and Perkins, Inc., was chosen by the Office of Naval Research to devise special methods, and techniques required and to manufacture the spheres. The spheres will be 20 in. in diameter, weigh between 21 and 22 lb with equipment, and will whip through space at a fantastic speed of nearly 18,000 mph.

STAINLESS STEEL MAKES THE DIFFERENCE

...its effect on car
sales and resales

Nothing sells and satisfies like quality. Stainless steel provides proof of quality in a way the buying public can easily understand.

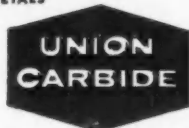
Consumers know from experience that stainless steel means rust resistance . . . strength . . . freedom from scratches and dents. They *know* it stays bright without polishing.

That's why stainless steel carries so much selling power in the showroom and even more on the used car lot.

For more facts about stainless steel see your supplier or write: ELECTRO METALLURGICAL COMPANY, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y.

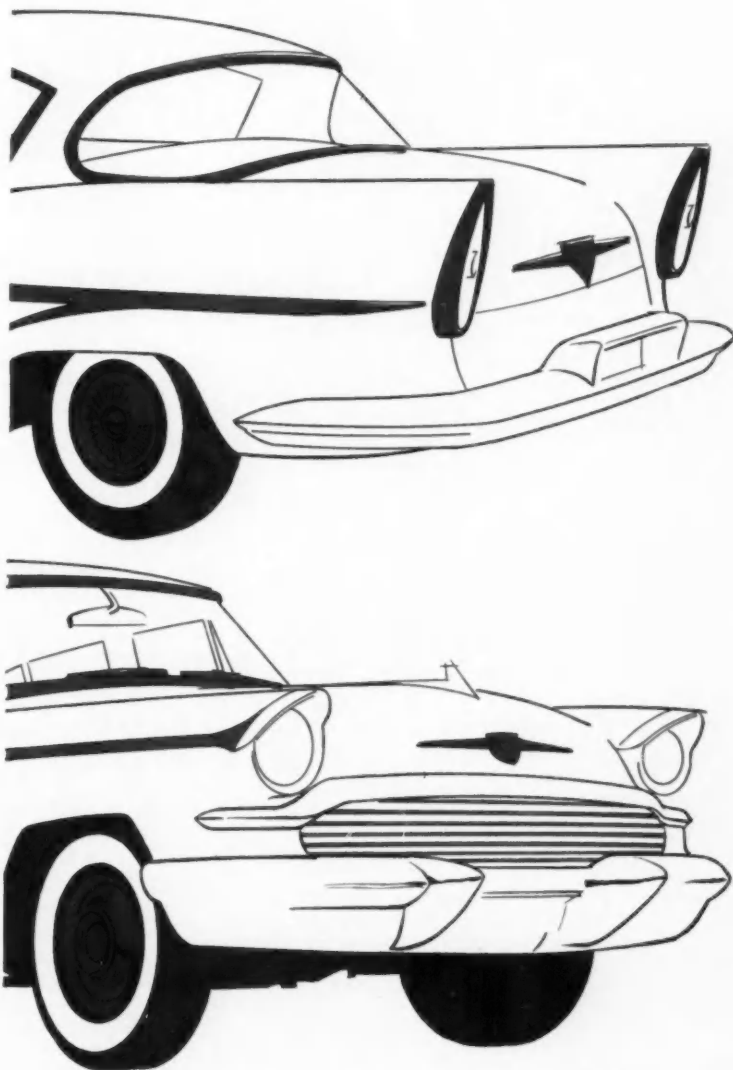
**METALS DO MORE ALL THE TIME
... THANKS TO ALLOYS**

Electromet
FERRO-ALLOYS AND METALS



The terms "Electromet" and "Union Carbide" are registered trade-marks of Union Carbide Corporation.

AUTOMOTIVE INDUSTRIES, September 15, 1957



Stainless steel styling is easiest of all to sell! Body and window mouldings, wheel covers, grilles, door handles and even roofs are stainless steel this year!

GEARS

by
FAIRFIELD



Send for illustrated bulletin
describing Fairfield's facilities.



A Plus Value IN ANY PRODUCT!

If GEARs are a vital part of the product you make, there is no finer recommendation for the **QUALITY** of your product than to be able to say it is equipped with "FAIRFIELD GEARs."

Long producers of the gears needed in high grade trucks and tractors, Fairfield now brings the same standards for **GEAR PERFORMANCE** to a wide variety of products: Agricultural Implements... Power Shovels... Machine Tools... Diesel Locomotives... Road Graders... Lift Trucks... Road Rollers... Pump Drives... Winches... Military Vehicles... and a host of others.

Fairfield's facilities are unexcelled. Here "under one roof" in a new and ultra modern plant, Fairfield has everything needed for producing all kinds of gears: spur... herringbone... spiral bevel... ground tooth spiral bevel... straight bevel... coniflex bevel... hypoid... zerol... worms and worm gears... splined shafts... differentials. Get acquainted with Fairfield—your inquiry will receive prompt attention.

FAIRFIELD
MANUFACTURING CO.

2303 S. Concord Rd.,
Lafayette, Indiana



Marvel-Schebler Fuel Injection System

(Continued from page 53)

The injection pump can be mounted in either a horizontal or vertical position, and either gear or belt driven. All moving parts are lubricated by engine oil or filtered gasoline.

The injection pump delivery can be changed to meet engine requirements by changing the plunger cam form to increase or decrease its stroke, and by changing the plunger diameter. This injection system is suitable for either manifold or direct cylinder injection, although nozzles for direct injection would be more expensive.

The Marvel-Schebler timed injection system not only accurately meters the correct amount of fuel required by the engine, but also controls the time during which the fuel is sprayed into the air going to the individual engine cylinders. This feature of timed injection is said to give optimum engine performance and fuel economy. Timed injection gives a smooth engine idle and also improves engine response to throttle opening without an excessively rich fuel air mixture so that good engine performance is obtained over the wide range of speeds and loads under which the automotive engine operates with maximum fuel economy.

Fuel injection, because of the work involved in mounting and calibrating for a particular engine, will generally be merchandised as original or optional equipment, rather than as an accessory.

Figure 5 shows an injection system installation on a 1957 passenger car engine. The injection pump is mounted on a bracket at the front end of the engine. A cog belt drives the injection pump correctly timed to the engine. The drive pulley is mounted on the front end of the engine crankshaft.

Readers of
AUTOMOTIVE INDUSTRIES
are always well informed

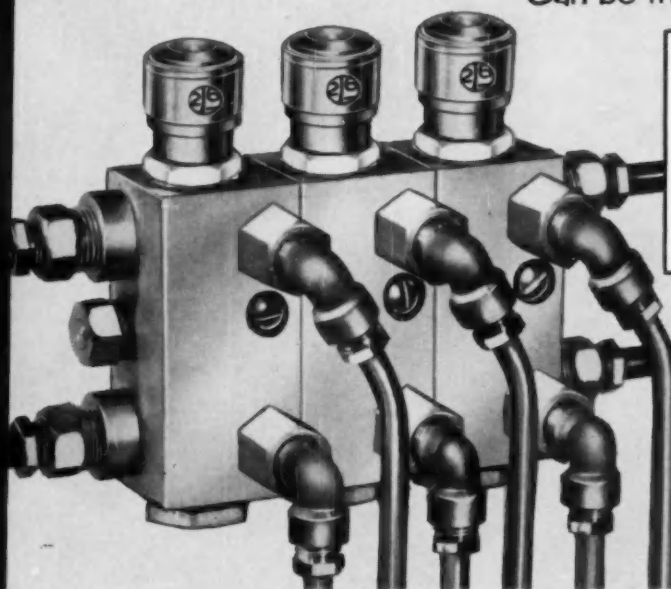
FASTER... FOOLPROOF... LESS COSTLY!

Meet toughest lubrication requirements

with this centralized

ALEMITE ACCUMATIC SYSTEM

Can be installed on any machine in 4 easy steps!



Type II Accumatic Valve

Handles difficult multiple-bearing lubrication under all conditions. Fully sealed for clean lubrication of power shovels, cement kilns, conveyors—any outdoor or indoor installation. Operates whether completely immersed in fluid... covered by dirt or grit... or protected by anti-corrosive paint. For fluid oil or light grease. Four sizes, delivering from .050 to .500 cu. in. of lubricant.

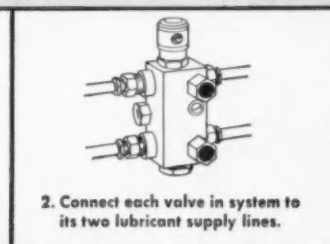
Fully hydraulic—no springs to adjust or replace.

Now available with Lubrication Recording Cycle Counter—for a fully automatic record of bearing lubrication!

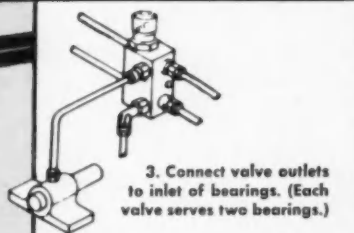
Tests show no appreciable variation in the amount of lubricant discharged after 73,312 cycles—equal to 122 years of twice-a-day service!



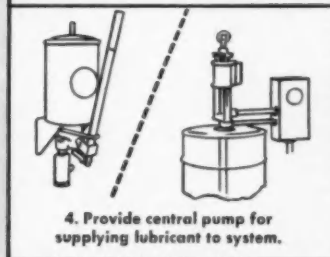
1. Remove grease cups or grease fittings.



2. Connect each valve in system to its two lubricant supply lines.



3. Connect valve outlets to inlet of bearings. (Each valve serves two bearings.)



4. Provide central pump for supplying lubricant to system.

ALEMITE ACCUMATIC ADVANTAGES!

- Prevents application of wrong lubricant.
- Seals completely against damaging dirt, grit and water.
- No parts are neglected—lubricates inaccessible and dangerous bearings at regular intervals.
- Eliminates product spoilage due to over-lubrication.
- Eliminates point-by-point lubrication methods—services all bearings in one operation.
- Delivers exact amount of lubricant to bearing.

ALEMITE

REG. U. S. PAT. OFF.

Division of STEWART-WARNER CORPORATION



FREE! Alemite Accumatic Catalog

Alemite, Dept. U-97
1850 Diversey Parkway, Chicago 14, Illinois
Please send me my free copy of the complete Accumatic Catalog.



Name.....
Company.....
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City..... Zone..... State.....

An Entirely New Concept



15,000 LB. MODEL

Greatest stability at every stage of 120 inch lift

Dotted line above shows how Automatic Elbolift's built-in retraction feature maintains maximum stability every inch of its 120" lift. Tilting action illustrated is operated by a single control lever which can tilt and/or lift load separately or simultaneously.

AUTOMATIC TRANSPORTATION COMPANY

Division of The Yale & Towne Manufacturing Company
101 West 87th Street, Chicago 20, Illinois

in Fork Lift Truck Design...

Automatic **ELBOLIFT!**

12,000 TO 20,000 LBS. CAPACITIES

Eliminates Mast Assembly...Weights 6000 lbs. less than any comparable mast-type truck...is definitely superior in stability, maneuverability, and operator vision.



370% More Visibility: Picture at left dramatically illustrates the increased visibility over conventional, mast-type, heavy duty trucks. Forks completely visible when entering pallet.

Drive tires two-thirds of Elbolift's width: 32 lineal inches of the truck's 48" overall width are in contact with the floor for the greatest load distribution and stability.



Maneuverability: Carrying a full load of 15,000 lbs. (52" square), the Elbolift passes easily through any 78" boxcar door...will right angle stack a 52" load comfortably in a 13'8" aisle.



Versatility: Ram attachment at left can be quickly and easily replaced by adjustable forks for handling dies, pallets, etc.

All conventional ideas of fork lift trucks were scrapped in designing this newest in the long, distinguished line of Automatic "firsts." Only in this way could Automatic engineers achieve the marked improvement in capacity, maneuverability, safety, performance and weight reduction which they had set as their goal.

The result is a truck with capacities from 12,000 to 20,000 lbs.—15,000 lb. model 48" wide, and 105 $\frac{3}{4}$ " long (less forks) is actually *three tons lighter than any comparable mast-type truck*. This permits the Elbolift to operate on floors that would be unsafe for other types of comparable capacity.

Its unique design is also responsible for other advantages...among them the following:

Exclusive New Power Steering Control—takes the guess work out of steering. *Operator always knows* the exact direction of his steer wheels by the position of the steering lever.

Shortest Inside Turning Radius—does more work, handles heavier loads in less space. Operates easily in 13'8" right angle aisle and 78" boxcar door with 52" square load.

Highest Lift With Lowest Overall Height—Elbolift has 80" overall lift with a 120" lift.

Safety—Easy on—easy off. Operator completely protected by counterweight on both sides and heel plate in the rear. Dead man control...returns speed controller to neutral and automatically applies brake when driver dismounts.

Exclusive New Inching Control—4 speeds forward and reverse with foot inching to any preset or selected speed.

Battery Accessibility—battery on rollers for quick and easy removal from either side.

But there's ever so much more than can be adequately described here. Why not get the whole story? No obligation. Just mail the coupon below...mail it today.

AUTOMATIC TRANSPORTATION COMPANY

57 West 37th Street, Dept. P-7, Chicago 20, Illinois

Rush me fully illustrated descriptive brochure on the revolutionary new Automatic Elbolift Trucks.

Your Name _____ Title _____

Firm Name _____

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City & Zone _____ State _____

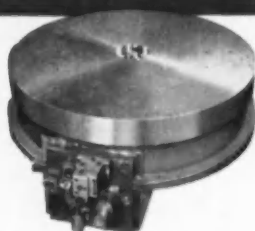


THIRTEEN STATION AUTOMATIC TRANSFER MACHINE

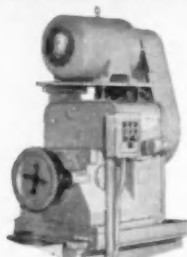
— mills, drills, reams, spotfaces, taps and saws apart cast iron bearing cap blocks. Machine includes 5 standard feed slides, 9 standard production units.

**Because
major
components
are
standardized**

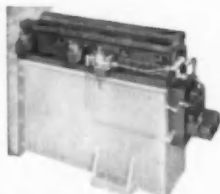
KEARNEY & TRECKER TAKES THE "SPECIAL COSTS" OUT OF PRODUCTION MACHINE TOOLS



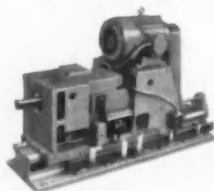
STANDARD ROTARY INDEX TABLE available in 4 different table diameters, any practical number of indexes.



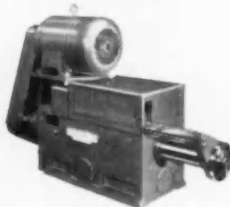
STANDARD MILLING HEAD UNIT 4 sizes. Single spindle . . . various horsepower and speed ranges . . . single or double reduction drive . . . automatic quill retraction. Any size can be modified for boring.



STANDARD FEED SLIDE UNIT provides hydraulic feed for milling, boring or drilling heads. Available in 4 sizes and in various length cylinder strokes.



STANDARD WAY TYPE DRILL UNIT for drilling, boring, reaming, counter-boring and chamfering. Single and multiple spindle arrangements, single or double feed rates.



STANDARD QUILL FEED UNIT for drilling, boring, reaming, spotfacing, counter-boring and chamfering. Single or multiple spindle arrangements — single or double feed rates.

Here's a sound, proven *economical* approach to your production machine tool problems . . . Kearney & Trecker production machine tools featuring standardized components.

You get **IMPORTANT SAVINGS**—benefit directly three ways: (1) lower initial cost; (2) less lead time needed and (3) proven standard units mean efficiency *plus* simplified machine maintenance.

Ask the Kearney & Trecker man—he'll show you more examples of standardized machine components in production machine tools — the keys to capturing more profits from production!

Kearney & Trecker Corp.
6774 W. National Avenue, Milwaukee 14, Wis.

ASK FOR FREE KEARNEY & TRECKER Production Machine Tools Bulletin SMD-57. It provides full standard component details — and their application to production machine tools.



Designers and Builders of Precision and Production Machine Tools Since 1898

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Moore Machinery Co.
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Dawson Mach. Co.
5700 First Ave., S.

SHREVEPORT, LA.
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701 Spring St.

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White Star Mach. Co.
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CANADA
MONTREAL
OTTAWA
QUEBEC
TORONTO
WINDSOR
Williams & Wilson Ltd.

Motor Vehicles in Japan

(Continued from page 50)

can machine tool builders. Yet it is significant that Nissan has pioneered what is said to be the first transfer machine installation in Japan. They have three rows of beautiful new transfer machines designed and built by two Japanese machine tool manufacturers. The equipment is used for machining cylinder blocks and heads. In appearance, at least, these transfer machines could be taken for equipment in use in Detroit.

That brings up an important point. Considering the vastly lower labor rates prevailing in Japan, if motor car producers install modern equipment and employ modern methods their small cars should be able to compete very well with European imports. And perhaps that is the probability for the near future.

It was our impression that one of the biggest lifts to Japanese economy might come from a major roadbuilding program. All roads are in bad shape and practically no roads exist between main cities. Road repairs and road building are going on right now but progress is slow since manual labor is employed extensively.

Yet the fact remains that new roads would speed the shipment of goods by truck; and would expedite the growing volume of tourist trade which now must take to the rails.

Japan does not permit the import of foreign cars. Yet how does one account for a fair number of American cars—Ford, Chrysler, Cadillac, Buick, Pontiac and others—as well as the numerous Volkswagens? The only way these cars can enter is in the form of private cars owned by members of the Armed Forces, shipped by the Government as part of their personal effects. We understand there are ways of transferring such cars eventually to Japanese owners, the few that have sufficient funds to swing the deal.

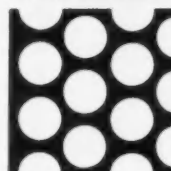
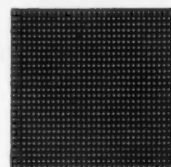
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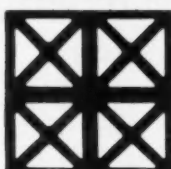
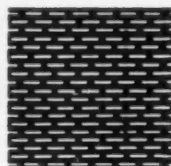
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Ross HPS Power Steering Gear

(Continued from page 65)

restrained from axial movement by the pressure of the centering springs against the centering plungers and by the oil pressure against the plungers. Both effects tend to center the spool and thus hold the valve in the neutral position. The inner portion of the end of each of the centering plungers

contacts the thrust bearing at each end of the valve assembly. The outer portion of these same plunger ends contacts the steering gear housing at one end of the valve and the upper cover at the other end. Axial movement of the cam results in compressing the centering springs between the

thrust bearing and housing in one direction and the other thrust bearing and upper cover in the opposite direction.

When the valve is in the center position, the oil pressure at its two cylinder ports is low and equal and produces ineffective forces in the cylinder. This results in no movement of the piston and no circulation of oil in the lines to the cylinder.

Whenever the driver's effort at the steering wheel overcomes the centering effect of the valve springs, the valve spool is moved axially, restricting one of the return passages to the outlet port, thus causing an immediate increase in pressure at one of the cylinder ports. At the same time, the other return passage is increased, allowing the fluid from the discharging side of the cylinder unrestricted flow to the outlet port. The immediate effect is high pressure in an end of the cylinder to actuate the piston which applies hydraulic power directly to the steering gear pitman arm or linkage part to which it is connected. Full pressure is obtained with a spool travel of only a few thousandths of an inch. The slightest movement results in a pressure differential.

Whenever the effort at the steering wheel is released, the valve spool is returned to the center position.

If the steered wheels are subjected to shock loads, the pitman arm, acting through the inner arm of the gear, shifts the cam and control valve spool in the appropriate direction, thus directing the fluid to the proper side of the piston to resist the shock forces. This blocking action prevents kickbacks at the steering wheel.

Depending upon the installation requirement, this gear can be furnished with the valve located at either end of the housing.

The valve may also be rotated in one of three positions, 120 deg apart, or inverted to provide correct positioning of the inlet, return and cylinder ports.

The HPS type Hydrapower gear is produced in two models—HPS52 and HPS70. The first has a ratio of 16:19:16 while the other has a 19:24:19 ratio. Angular arm travel for either model is 80 deg.

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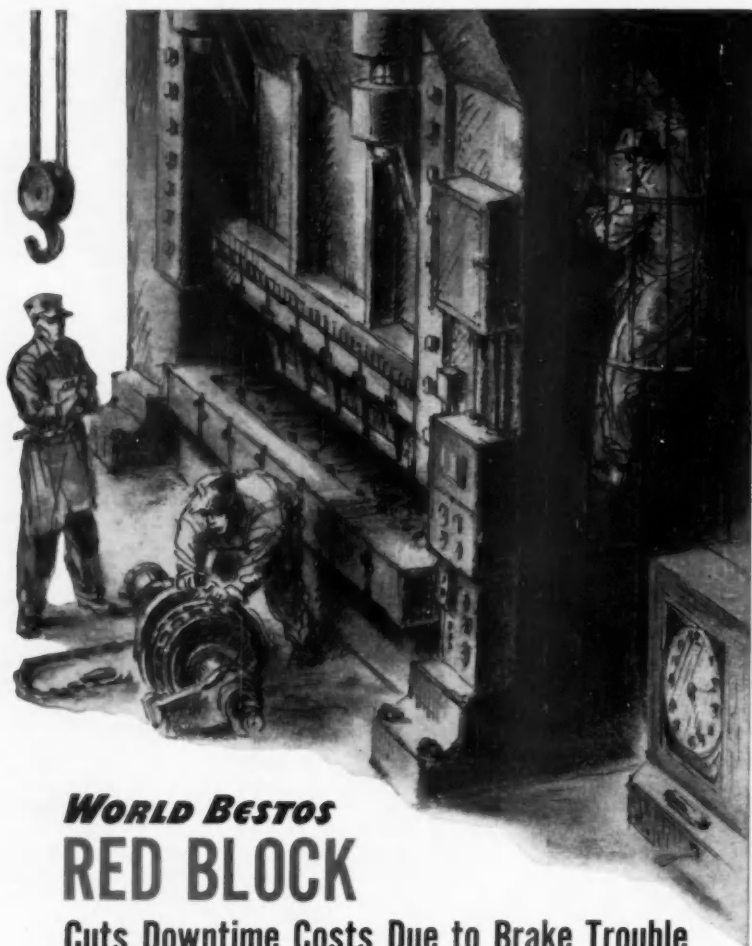


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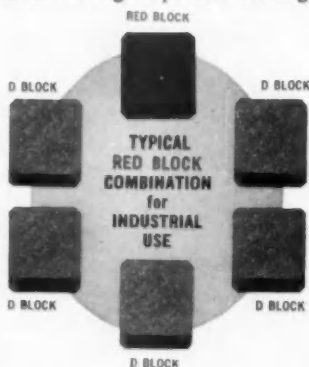
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Brake Blocks and Linings • Clutch Facings
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and Buttons • Special Friction Materials

AI TABLOID AI

(Continued from page 37)

Lockheed Aircraft Corp. is now offering its 16,200-hp propjet cargo plane, Hercules, to world airlines for commercial use, and expects to have the first plane ready in early 1960.

* * *

Solar Aircraft Co. has received a supplementary contract to manufacture lightweight panels of all-metal honeycomb sandwich for the supersonic bomber, B-58 Hustler.

* * *

Northrop Aircraft, Inc., has created a new division, called Nortronics, to handle design, development, and manufacture of electronic, electro-mechanical, and opto-mechanical products and components.

* * *

A portable electric bomb hoist that weighs only 47 lb and can lift up to 2500 lb at the rate of 15 ft per minute has been developed at El Segundo Div. of Douglas Aircraft Co.

* * *

Gould - National Batteries, Inc., through a wholly owned subsidiary has purchased the assets of Nickel Cadmium Battery Corp., pioneer manufacturer of nickel-cadmium batteries in the U. S.

* * *

Pennsalt Chemicals Corp. has established a wholly owned subsidiary in Canada to be known as Pennsalt Chemicals of Canada, Ltd.

* * *

Dow Chemical Co. under the terms of a merger agreement has acquired the assets of Dobeckmun Co., which will retain its name as a division of Dow Chemical.

* * *

Valvair Corp. recently completed a new product development and testing laboratory.

* * *

DeVilbiss Co. has agreed to purchase the Newcomb-Detroit Co. and will operate the concern as a subsidiary.

(Turn to page 164, please)

no chipping - no rusting
no pitting - no peeling

no work - no worry

with ever-bright brightwork of

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Let it rain, mist or dew
... for the lifetime of
the car, stainless steel brightwork never
needs care. Exposure to the elements can't
harm it. You don't lift a finger or pay a penny to keep
the showroom shine of *stainless*. • Strong, hard, ever-
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are, it'll be SUPERIOR.*

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Ozone deterioration

Continuing stress

Gas leakage

Rough handling in use

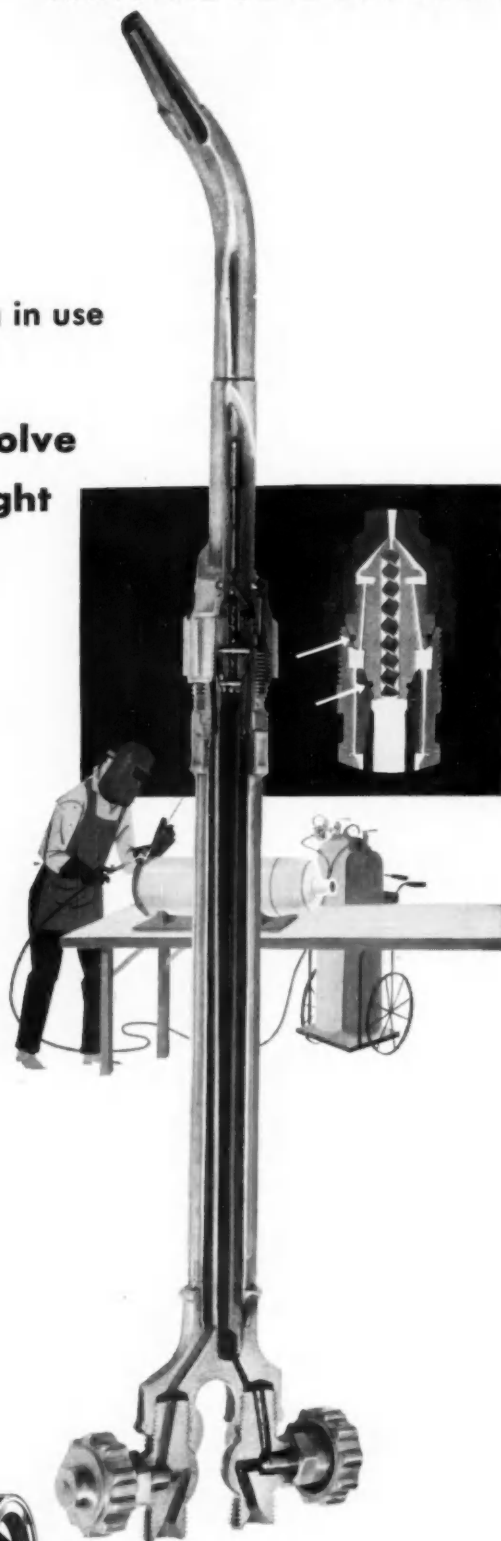
New National Hypalon O-rings solve these problems; insure a hand-tight gas seal in Victor Torches

As static seals, commercial Buna N O-rings performed satisfactorily in Victor welding torches — *when the rings were new.*

However, ordinary O-rings age fast in welding torches. They receive rough treatment when welders change nozzles; nozzles are often dropped on the ground to lie there until needed again. Severe ozone deterioration is experienced. Continuing stress, although mild, impairs O-ring elasticity. Rings on welding nozzles are sometimes subjected to long shelf life.

National Seal engineers developed a new O-ring compound, National Hypalon L-11, which not only withstands rough handling, ozone deterioration and stress but exhibits many times the shelf life of Buna N compounds previously used. Today, National Hypalon is standard at Victor.

Special compounding to meet unusual conditions is a basic part of National's complete O-ring engineering service — service available from National Field Engineers in major cities nationwide.

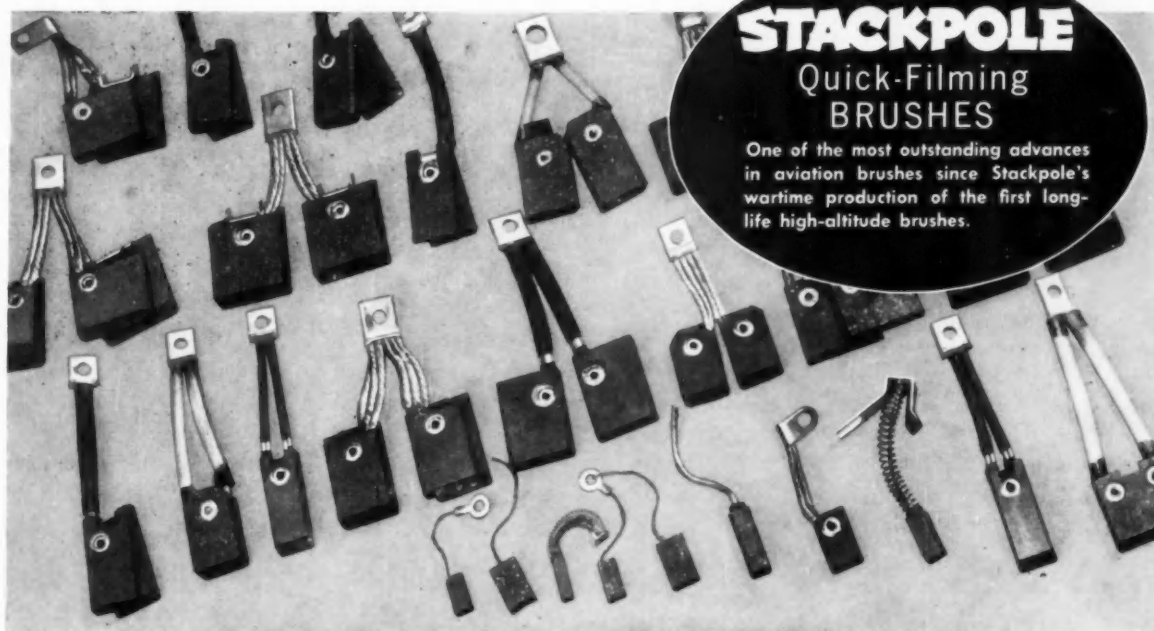


NATIONAL SEAL

Division, Federal-Mogul-Bower Bearings, Inc.
General Offices: Redwood City, California
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4374



STACKPOLE Quick-Filming BRUSHES

One of the most outstanding advances in aviation brushes since Stackpole's wartime production of the first long-life high-altitude brushes.

NOW! Immediate HIGH-ALTITUDE BRUSH PERFORMANCE

... without any sea level filming run

Stackpole Aviation Brushes in a new line of Quick-Filming grades give *immediate* and highly satisfactory high-altitude performance. No break-in filming run is needed. Just seat the brushes properly and they're ready to go.

Best of all, immediate filming for service at higher and still higher altitudes has *not* been obtained at the expense of any other essential phases of brush performance. Note these features:

EXCELLENT COMMUTATION from no load to full load; from minimum speed to overspeed; and through rapid transitions from earth surface to high altitudes, Stackpole Quick-Filming Brushes assure smooth, well-filmed commutators without grooving.

LONG LIFE—Seldom if ever will it be necessary to obtain a waiver on high-altitude brush life specifications.

GREATER STABILITY over a wide range of operating conditions. You'll be pleasantly surprised with the relative stability of Stackpole Quick-Filming brush temperature, field current and commutation under speed, load, temperature and altitude variations.

LOWER, MORE STABLE BRUSH TEMPERATURES—Vastly improved commutation combines with exception-

ally low friction coefficient to reduce and stabilize brush operating temperatures materially.

CONTACT DROP vs Current Density curve that approaches a straight line relation—This feature helps distribute brush wear uniformly, counteracts selective wear on multiple-brush installations. A wide range of values is available to meet specific application needs.

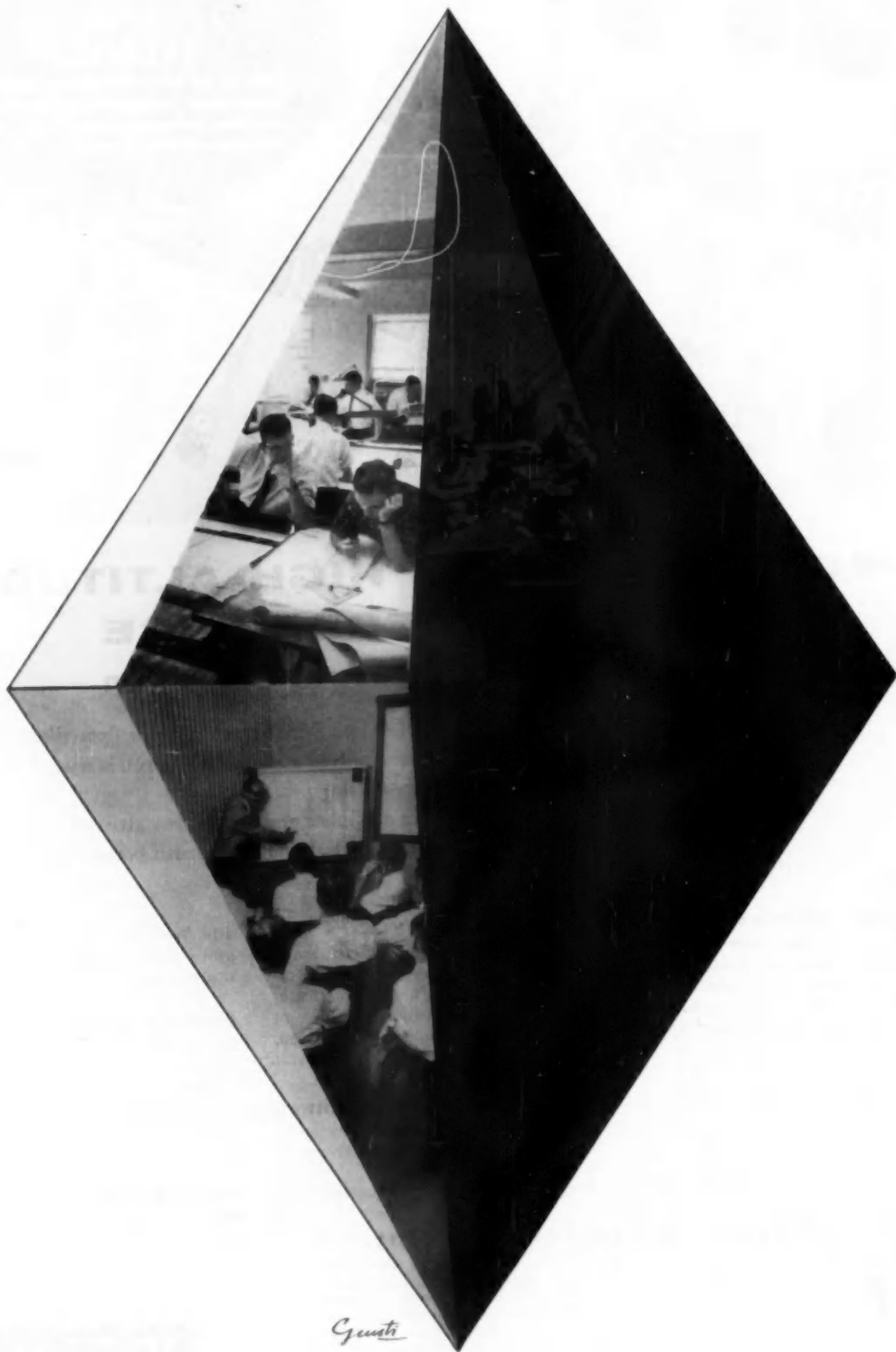
NON-CORROSIVE, STABLE TREATMENT—The special Quick-Filming treatment of these Stackpole aviation brush grades readily lends itself to silver-soldering of rivet connections.



Aircraft Brush Inquiries Invited

Stackpole Quick-Filming Brushes are available in many contact drop levels, with various degrees of high-altitude treatment, and in types, for practically any aviation rotating electrical equipment. Stackpole brush engineers welcome the opportunity to apply them to your aviation equipment, old or new. Best recommendations can, of course, be made on the basis of complete details of the equipment and test operating conditions.

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Their tools: vision, the benefit of more than 40 years of Olin Mathieson experience in producing non-ferrous metals, and an investment of \$300 million.

Their goal: Quality and Service standards unique in the Aluminum industry.

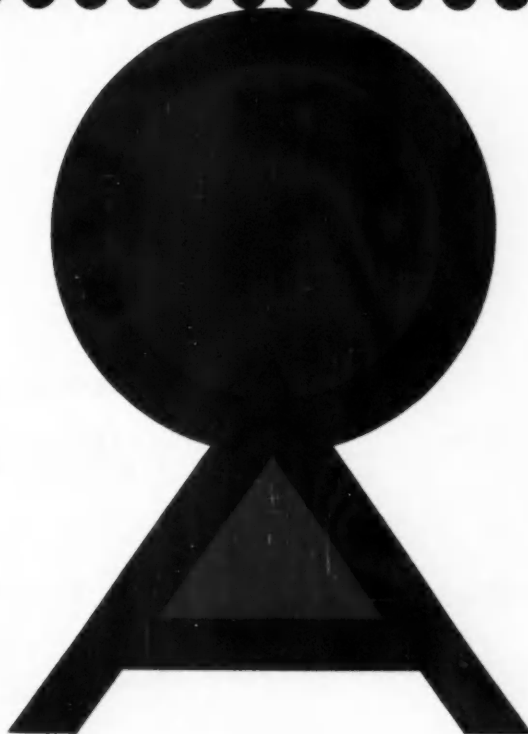
What do these new standards mean? Custom-Tailored Aluminum...with finishes and tolerances tailored specifically for you, to meet your individual production needs. Competitively superior Aluminum that will simplify your manufacturing operations and give you maximum output for each pound consumed. And with it: Outstanding Technical and Sales Service—the kind that values your continuing satisfaction as the most important criterion of success.

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For more information about Olin Aluminum, write: Aluminum Division—Sales, Olin Mathieson Chemical Corporation, 460 Park Avenue, New York 22, N. Y.

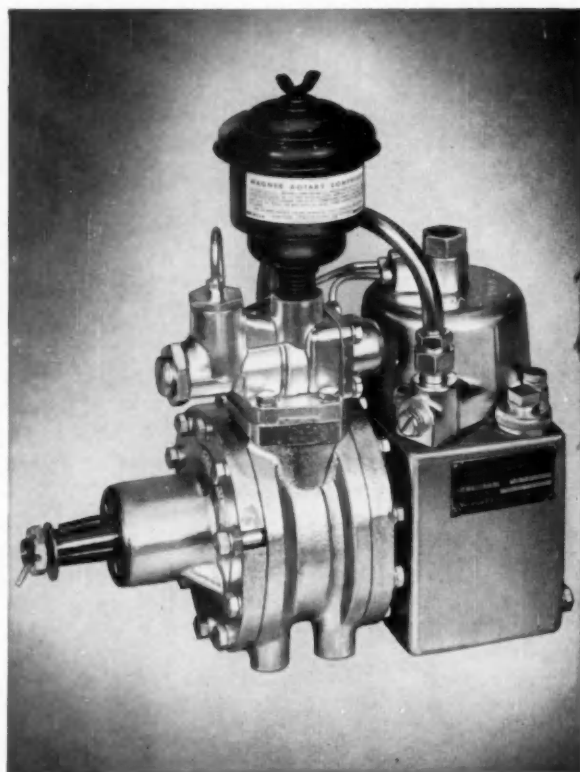
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**WAGNER MOISTURE
EJECTION VALVE**

is one of many important Wagner Air Brake Components available to you. This fully automatic valve keeps air reservoir clean and dry.

Operating in the 15 to 20 p.s.i. air pressure range, it ejects moisture with each average brake application without causing a noticeable drop in tank pressure. May be mounted in any convenient location. No heating element is needed, as this valve cannot freeze in open (exhaust) position. Installation is quick and easy.

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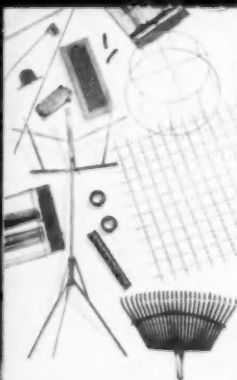
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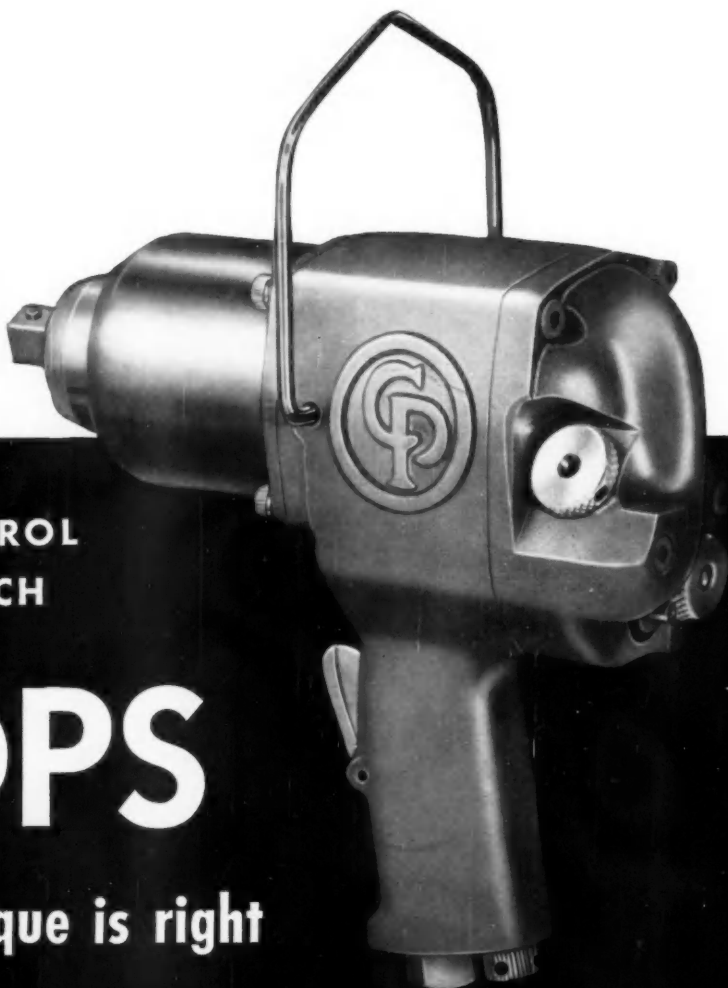
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RANGE OF TORQUE ADJUSTMENT—12 to 80 foot pounds.

SHORT OVER-ALL LENGTH—only 7½"—permits close-quarter work; weighs 6¾ pounds.

CAPACITY: ¾" bolt size—heavy duty.



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NEW PRODUCTS

(Continued from page 80)

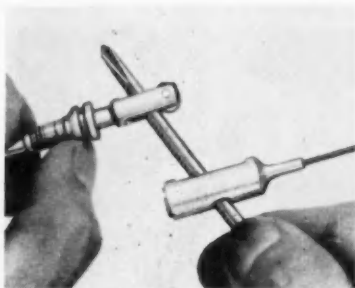
bodies hauling bulk material heated to facilitate unloading.

Alloy X5454 provides maximum strength for aluminum applications exposed to temperatures in the 150 to 300 F range. Under these conditions, it displays high resistance to corrosion and stress corrosion in all temper specifications. There are no restrictions on the extent of cold forming. Welding characteristics are said to be excellent. *Aluminum Co. of America.*

Circle 37 on postcard for more data

Cable Quick-Disconnect

Simplifying cable rigging operations by combining a disconnect and turnbuckle in a single unit, a new one-ounce quick-disconnect for aircraft control cable has been designed for minimum weight and size needs. Called the Mark II Speed Rig, it reduces the normal cable rigging oper-



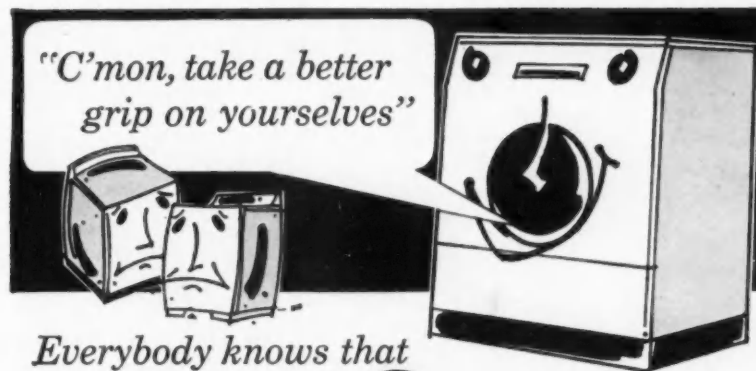
ations to a single operation in a single location in the system, and allows a disconnect and a turnbuckle for about the same weight as a standard turnbuckle. An unusually small diameter makes it possible to use the disconnect in tight quarters, even where cables are closely grouped. Operation is quick and without using special tools. *Pacific Scientific Co.*

Circle 38 on postcard for more data

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Ceramicite is the designation for a new ceramic material for hermetic seal applications at high temperatures. The compound bonds physically to most stainless steels, and its thermal expansion is similar to that of the metals. Seals embodying Ceramicite are said to have exceptional ability to withstand severe physical

(Turn to page 158, please)



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Appearance and quality are vitally important to consumer acceptance of any appliance. So is the durability with which the mechanical components are fastened together.

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Exclusive Everlock Chisel Edges firmly grip both the fastener and the product!

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driving screws!



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Any bolt size...any number of spindles...maintains desired torque manual or completely automatic operation. Write for an Ingersoll-Rand AlRengineer to survey your needs.

Automatic assembly machine feeds and drives four self tapping screws in three seconds.

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NEW PRODUCTS

(Continued from page 157)

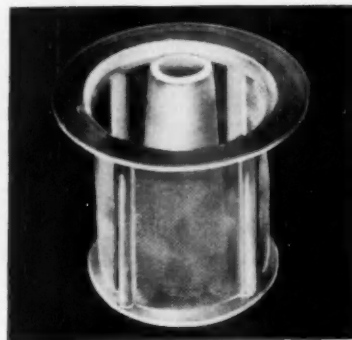
and thermal shocks without leaks or cracking.

The heating required by the sealing process causes unique changes in the linear expansion properties of the materials. The result is a common coefficient permitting crystalline migration between the interfaces of the materials involved during the cooling cycle. Thus an actual molecular bond is said to exist between the metal and the Ceramicite, assuring a tight seal with excellent electrical characteristics in continuous operation at temperatures up to 700 F. Consolidated Electrodynamics Corp.

Circle 39 on postcard for more data

Filter Elements

All-nylon filters, designed to withstand rust and corrosion in a range of applications, have been announced. The Danco filters are custom-molded in types, sizes and shapes to meet



specific filtering needs. They are one-piece nylon moldings with nylon mesh and supporting structural frame injection-welded together. Savings in cost result, it is said.

The nylon screen filters are stated to be effective in the filtration of lubricating, Diesel, cutting and hydraulic oils, gasoline, water and air among other applications. The Danielson Mfg. Co.

Circle 40 on postcard for more data

Contact Rings

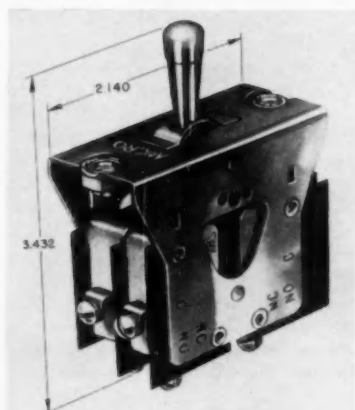
New silver-nickel-graphite electrical contact rings are being offered for current carrying in hinged connections of such products as circuit breakers and disconnect switches. Made of powdered metals and called

Gibbsloy NC-205, the new ring material improves conductivity and causes surer contact when used as washers. It is recommended by the company where low contact resistance is important while maintaining high wear resistance under heavy sliding action. *Gibson Electric Co.*

Circle 41 on postcard for more data

Toggle Switches

Three-position toggle switches which have safety catches to guard against accidental toggle lever movement are in a new series now being marketed. The safety catch holds the toggle lever in a set position and a pull of about 0.109 in. is required to



release the lever for movement. One of the new switches, designated 111AT, has two basic switching units in each assembly, while the other, designated 115AT, has four switching units. All switching units have SPDT arrangement.

Electrical ratings are: inductive 10 amp at sea level, 6 amp at 50,000 ft; resistive 10 amp; motor 6 amp. Basic switching units used in the switches are listed by Underwriters' Laboratories for 10 amp, 125, 250-v ac; 1/2-amp, 125-v dc; 1/4-amp, 250-v dc. *Micro Switch Div., Minneapolis-Honeywell Regulator Co.*

Circle 42 on postcard for more data

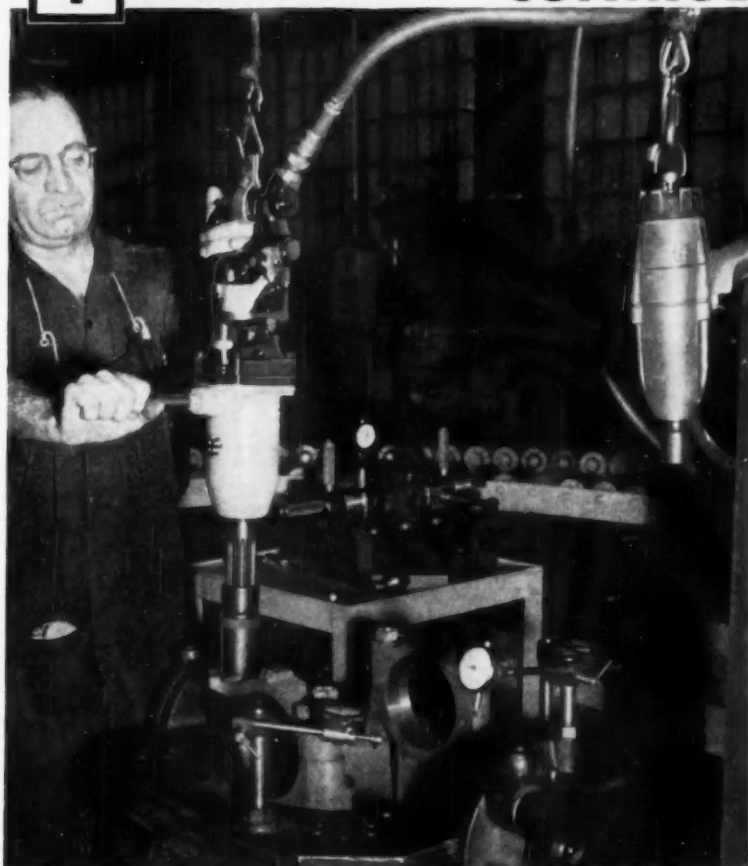
Engine Bearings

To be known as Clevite 55, a new copper-lead bearing material has been developed for "intermediate duty" applications. It is intended for use in engines which have loads beyond the capacity of babbitt bearings, but which do not require the load-carrying capacity of Clevite 77 bearings.

Clevite 55 utilizes a combination of
(Turn to page 160, please)



TORSION BAR TORQUE CONTROL



TORQUE CONTROL IMPACTTOOLS

consistently run nuts to prescribed torques

I-R Torsion-Bar Impacttools now assure top quality control on these 3 operations:

1. Assembling differential main bearing caps at 450 ft. lbs. both before and after machining as shown above.
2. Preloading differential drive pinion bearing with Impacttools set at 375 ft. lbs.
3. Assembling wheels to wheel hubs at 425 ft. lbs.

Quality control has risen to a new high for this large manufacturer of farm equipment since I-R Torsion-Bar Torque Control Impacttools were installed.

These Impacttools are the *only* power wrenches that deliver full power and speed until the preset torque is reached, and then instantly and automatically shut off.

Now, with Torque Control Impacttools, the company consistently runs nuts to prescribed torques, saves time, improves quality and eliminates hand torque checking operations.

Write for Bulletin 5170 for proof of how these amazing Impacttools can improve quality and cut costs on your own applications.

Ingersoll-Rand

11 Broadway, New York 4, N.Y.

8-524

NEW PRODUCTS

(Continued from page 159)

a sintering process and strip casting techniques. First, a copper powder is sintered to the steel back to form a porous lining, into which a lead-tin alloy is cast, surrounding the copper particles and forming a copper-lead matrix. After being broached and burnished to size, the bearing is then plated with pure tin for surface protection. According to the company,

these combined methods result in an exceptionally homogeneous matrix, with fine grain and uniform dispersion of copper and lead-tin alloy. *The Cleveland Graphite Bronze Co.*

Circle 43 on postcard for more data

Insulating Fabrics

Two types of high temperature insulating fabrics for service up to 1500 F have been announced. Made of Fiberfrax ceramic fiber, the fabrics are available in various widths and

thicknesses for insulation applications. They are also supplied as instrumentation tapes for both insulation and leak detection.

The instrumentation tapes consist of two stranded Chromel wires covered with reinforced ceramic fiber. When wrapped around pipes carrying metallic or radioactive fluids, the tape both insulates and causes an alarm-sounding short circuit in the event of a leak. This tape is designed to withstand 1500 F for 1500 hours, and is flexible enough to be wrapped in spiral form around pipe as small as 1/2-in. diam.

These new fabrics can be treated with silicone rubbers, epoxy resins or can be impregnated with phenolic resin and molded into various shapes. If desired, they can be woven in tubular form. *The Russell Manufacturing Co.*

Circle 44 on postcard for more data

ROCKFORD

MORLIFE® Spring Loaded CLUTCHES Provide



**100%
MORE
GRIP**

ROCKFORD Spring-Loaded CLUTCHES, equipped with MORLIFE clutch plates, provide 100% more torque grip than previous type clutches of equal size. This permits the use of smaller diameter clutches. Easier operation is accomplished by reducing the required engaging pressure. 50% better heat disposal avoids down-time caused by burned or warped plates. Numerous field records prove that MORLIFE clutches operate 400% longer without plate replacement or adjustment. Let these NEW type clutches help improve the operation of your heavy-duty machines.

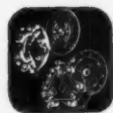


SEND FOR THIS HANDY BULLETIN
Gives dimensions, capacity tables and complete specifications. Suggests typical applications.

ROCKFORD Clutch Division BORG-WARNER

315 Catherine St., Rockford, Ill., U.S.A.
Export Sales Borg-Warner International — 36 So. Wabash, Chicago 3, Ill.

CLUTCHES



Small
Spring Loaded



Heavy Duty
Spring Loaded



Oil or Dry
Multiple Disc



Heavy Duty
Over Center



Power
Take-Offs



Speed
Reducers

Stoplight Switch

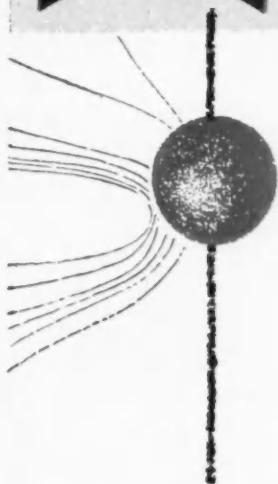
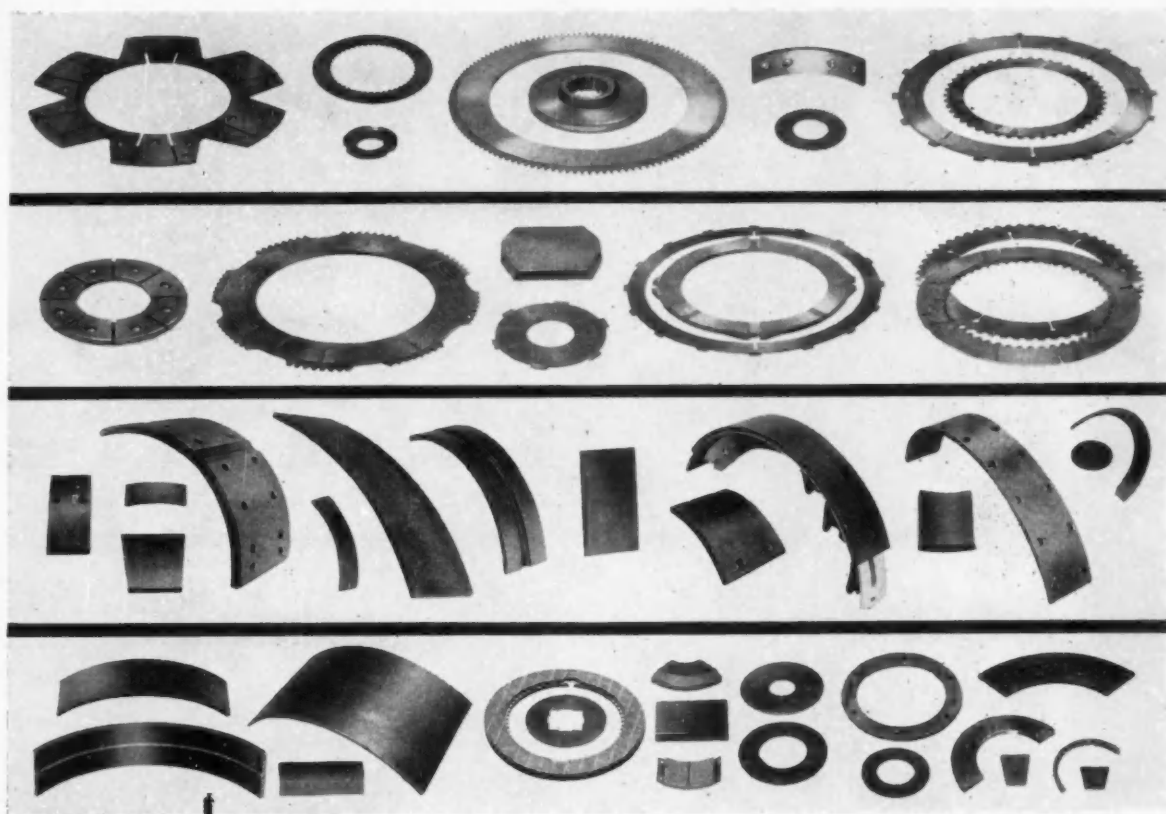
Development of a new double-throw stoplight switch which actuates truck trailer stoplights when brakes are applied by emergency controls has been announced. It supplements the standard stoplight switch installed in vehicles equipped with air brakes. Whereas the standard switch is op-



erated by pressurizing of the service line, the new stoplight unit is activated when an emergency application is made and pressure is exhausted from the emergency line.

A vacuum suspended stoplight switch which provides trailer stoplight actuation on combinations with vacuum braking systems has also been introduced. Both the air and vacuum brake emergency stoplight switches are said to meet requirements of the new ICC emergency braking regulations. *The Midland Steel Products Co.*

Circle 45 on postcard for more data



ON THE SHELF

to give you greater design freedom

IF your engineering creativeness is blocked from promising solutions by the limitations of friction materials you know about...

IF you face a target date that precludes "from scratch" development and testing of either organic or sintered metal materials basic to new designs...

You may find your answer already "on the shelf" at American Brakeblok. Continuous research sets new friction material standards. A wide range of new materials—with exceptional static and kinetic friction coefficients, fade and recovery values, temperature resistance and wear resistance—is backed by detailed test data, and available for immediate use. Let's talk over your problem.

FRICTION PROBLEMS SOLVED IN ADVANCE

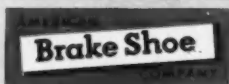
American
REG. U. S. PAT. OFF.
Brakeblok
FRICTION MATERIALS



Basic chemical research develops new formulations



Quality control insures performance standards



AMERICAN BRAKEBLOK DIVISION
DETROIT 9, MICHIGAN

NOW... CERTIFIED BY...

HERRMANN RECIPROCATING PISTON FOUR-CYCLE

Form ACA 501
(7-45)

UNITED STATES OF AMERICA
DEPARTMENT OF COMMERCE
CIVIL AERONAUTICS ADMINISTRATION
WASHINGTON

ENGINE TYPE CERTIFICATE No. 293

This certificate, issued to **Herrmann Engineering Company**
Glendale 1, California

certifies that the following is of proper design, material, specifications, construction, and performance for safe operation, and meets the pertinent minimum standards, rules, and regulations prescribed by the Civil Aeronautics Board:

Gas Engine Model X375

This certificate is of indefinite duration unless canceled, suspended, or revoked.

Date **June 13, 1957**

By direction of the Administrator:

(Signature)

Stephen H. Rolfe

(Title)

Stephen H. Rolfe
Chief, Power Plant Branch

This certificate may be transferred if endorsed as provided on the back hereof.

Any alteration of this certificate is punishable by a fine of not exceeding \$1,000, or imprisonment not exceeding 2 years, or both.

C.A.A.

CAM-TYPE ENGINE!

Engine Type Certificate No. 293

After repeated exhaustive tests, the Civil Aeronautics Administration has issued, on June 13, 1957, Engine Type Certificate No. 293 to Herrmann Engineering Co., approving the Herrmann Cam Engine Model X375. This is a four-cycle, internal combustion, reciprocating engine embodying revolutionary old-new principles which are expected to prolong the use of these engines for many years.

For detailed information,
technical data and
suggested applications
write to

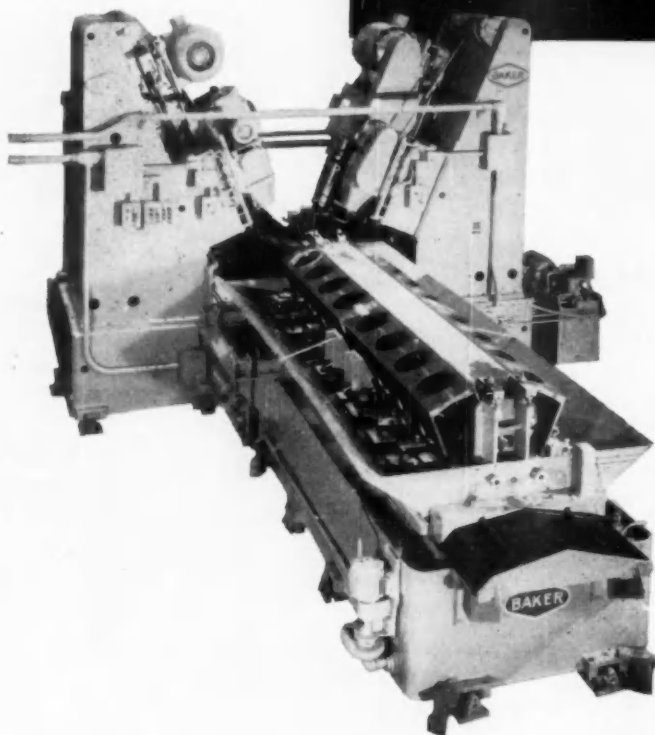
HERRMANN ENGINEERING CO., 1405 Airway, Glendale 1, California

Special features found only in the Herrmann Cam-type engine

1. There are fewer parts. It has no crankshaft, vibration damper or counterweight. There is no main bearing caps, liners and bolts, no push rods or rocker arms. It has no connecting rods with caps, bolts or liners. In effect there is no crank case.
2. The crankshaft is replaced with a straight shaft, and main bearings are straight bushings. A comparatively low cost cam replaces connecting rods. Two disc cams mounted on the straight main shaft operate the roller tappets which are in line with valves located in the head of the cylinder.
3. The total number of parts approximates half of those found in competitive engines. The nearest and most popular known has 2410 parts as compared with 1206 in the Herrmann engine.
4. The dry weight of the engine equipped with distributors is 264 pounds. With dual ignition, including distributor and magneto for each cylinder plus starter and generator the weight is nearly 335 pounds. A weight study of this engine indicates that it can be reduced further by about 22 pounds without affecting the operation or life.
5. The compact torpedo shape requires less frontal area for any installation. Engine and accessory section can be turned to reduce overall height.
6. Inherently the engine main shaft runs at half speed. This permits a propeller speed much more efficient without the necessity of reduction gearing with their added weight and complexity.
7. The Herrmann engine has a uniform torque similar to that of a turbine. There are twelve power strokes per shaft revolution instead of the three obtained with competitive engines.
8. The Herrmann engine operates on the standard four cycle principle. The design of the cam produces four strokes per shaft revolution instead of the two strokes of the conventional crank type engine.
9. All pistons have harmonic motion and therefore all reciprocal forces balance out against the cam and never reach the shaft, bearings or housing. This reduces vibration to a negligible amount.
10. From the above it will be observed that maintenance costs can be materially reduced:
(A) because of the reduced number of parts,
(B) because most of the remaining parts carry up to 80% less load, and
(C) because assembly and disassembly time of the basic engine is reduced to 1/3 of that required on conventional engines.
11. Because all important forces are balanced and/or greatly reduced near their source, the same engine can be used for all types of service, meeting the requirements for Aviation, Marine, Automotive and Stationary installations.
12. Although Model X375 was type-tested and approved at 200 horsepower, it develops up to 225. Other models may be produced utilizing the same Herrmann design, which will develop greatly increased horsepower ratings.

BAKER AUTOMATION

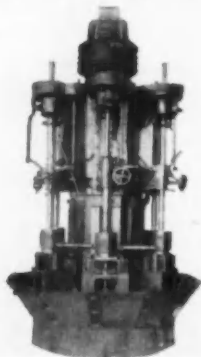
*Best in the long run
Practical in the short run*



NEW BAKER SPECIAL bores diesel engine cylinder blocks - automatically

The latest of a long line of Baker special machine tools . . . operations are rough and finish bore and counterbore 6 to 16 holes for cylinder sleeves; drill dowel pin holes.

Compare with the early Baker special "Rotary" below — the *man* walked around the *machine*!



BAKER BROTHERS, INC.
Dept. AI-957, Toledo 10, Ohio

Send me data on automation with . . .

☐ Baker Specials ☐ Baker standard machines

NAME AND TITLE

COMPANY

ADDRESS

CITY

ZONE STATE

AI TABLOID AI

(Continued from page 146)

Pittsburgh Screw & Bolt Corp. is acquiring Southington Hardware Mfg. Co. . . . Electronic Craftsmen, Ltd., has acquired the assets of Electro Coil Co.

* * *

Aluminum Co. of America has made available to designers and design engineers in the metalworking industry a selected bibliography from its library.

* * *

Gulton Industries, Inc., has acquired CG Electronics Corp. . . . Bernco Engineering Corp. has purchased Electric Switch Corp.

* * *

Minneapolis - Honeywell Regulator Co. has entered the plastics field with full-scale production of epoxy casting and potting compounds designed especially for use in the electronics industry.

* * *

Wausau Motor Parts Co. has moved into a new plant at Schofield, Wis. . . . Minnesota Mining & Mfg. Co. has opened a new branch office and warehouse at 12200 Brookpark Rd., Cleveland, O.

* * *

Young Radiator Co. has appointed Flournoy & Everett, Inc. of Downey, Calif., as engineering, sales and service representatives for Young shell and tube heat exchanger products in Southern California.

* * *

Clark Equipment Co. has acquired a 30 per cent equity interest in Ruhr Intrans Hupstapler G.m.b.H., a West German concern which has been producing Clark fork lift trucks under license.

* * *

Cleveland-Akron Section, Society of Plastics Engineers, is sponsoring a regional technical conference on polyethylenes at the Hotel Carter, Cleveland, O., Oct. 17, 1957.

* * *

Drop Forging Association is moving to new quarters in the Illuminating Building, Cleveland, O. . . . National Vulcanized Fibre Co. has opened a new district office at 2411 Covina Way South, St. Petersburg, Fla.



NOW—a truck governor that regulates road speed—not engine speed

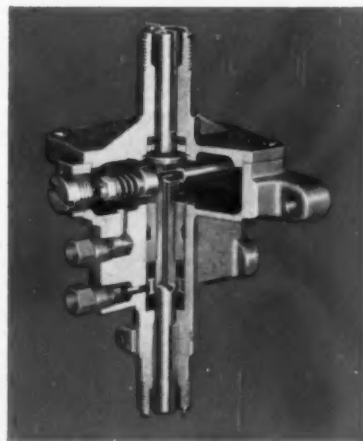
For the first time, truck fleet operators can get accurate, predetermined economy results with all trucks by having all trucks operate at road speeds which have proven most economical. The new Holley roadspeed governor is driven relative to rear wheel speed instead of relative to engine speed. It can easily be calibrated for any truck gear ratio and has been successfully tested over thousands of miles of road conditions.

The Holley roadspeed governor can be used in conjunction with the engine speed governor. Thus, if the vehicle is running in one of the lower gears and the engine reaches its governed speed

before reaching the predetermined mile per hour setting, the engine speed governor controls. In the event that road speed is reached prior to the engine rpm maximum setting, as in high gear, the roadspeed governor controls.

The roadspeed governor offers fleet operators a complete governing system designed to allow maximum horsepower under extreme load conditions and yet providing pinpoint control of road speed for maximum economy.

For more information on the Holley roadspeed governor, simply send a request on your letterhead.



The new Holley road speed governor, engineered to regulate actual road speed, is designed to eliminate mechanical trouble and prevent malfunctioning.

*For more than half-a-century
original equipment manufacturers
for the automotive industry.*

HOLLEY
Carburetor Co.

T-8

11955 E. NINE MILE ROAD • WARREN, MICHIGAN

"30 million Alcoa impacts save

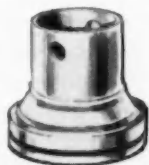


auto-makers millions of dollars!"

This year alone, Alcoa will produce enough impact extrusions for the automotive industry to stretch from Los Angeles to New York—30,000,000 impacts! And the money saved by using impacts will stretch a long way, too—adding up to millions of dollars!

Impacts are basically cup-shaped parts having cold-forged sections combined with extruded sidewalls. An impact that each of us holds every day is the familiar toothpaste tube. Impacts are made by placing an aluminum slug in a die cavity and striking it with a punch.

The punch has the shape of the inside of the part—the die cavity has the outside shape. As pressure is applied, the metal is forced up around the outside of the punch to form the walls of the part. The end section of the impact is forged under great pressure in the bottom of the die. The basic tooling used to produce closed end impacts can be modified to produce parts with many complex design features. Here are some impacts typical of those Alcoa has produced for the automotive industry:



POWER STEERING COLUMN SUPPORT:

This no-draft, precision impact reduces costly machining and holds 850 pounds psi hydraulic pressure without impregnation. It is typical of the strength with economy that can be achieved with impacts.



TORQUE CONVERTER REACTION SHAFT:

An excellent example of the ability of impacts to withstand stress loading is this shaft which is subjected to a torque of 800 foot pounds. Precision tolerances are achieved with impacting, together with free

machining characteristics for efficient production. The inside diameter serves as a bearing surface, eliminating the need for a bushing insert.



HYDRAULIC ACCUMULATOR:

Use of impacts as pressure containers is illustrated by this impact, designed to hold hydraulic fluid under pressures exceeding 1,000 pounds psi. A controlled variable wall thickness was achieved.



OIL FILTER CASE:

An excellent example of design flexibility. This one-piece, seamless, centertube oil filter case replaced a welded assembly of two pieces of tubing and an end plate. The new case is more economical as an impact and more reliable than the assembled version.



SPEEDOMETER DRUM:

Impact extrusion is the only practical method for producing this seamless, thin wall (.010") speedometer drum. Extremely close concentricity is necessary to insure accurate balance.

The design latitude, high mechanical properties and economy of Alcoa® Impacts make them ideally adaptable to automotive applications. It will pay you to take a long look at this versatile process. Our development division will work with you to help apply the process to parts for your new models.

WRITE FOR FREE BOOKLET:

Alcoa Impacts — Aluminum Company of America, 1841-W Alcoa Building, Pittsburgh 19, Pennsylvania.



THE ALCOA HOUR — TELEVISION'S FINEST
LIVE DRAMA — ALTERNATE SUNDAY EVENINGS

ALCOA ALUMINUM gives every car more GLEAM AND GO



Both make decisions, but the Tool Engineer can't be wrong

Calling a play is one thing. Calling out the proper tooling material is quite another. The man designing tools for long run production cannot second-guess. His decisions are more studied, but his margin of error is less.

In any league . . . small contract shop or vast engineering organization . . . Pioneer 921-T has scored phenomenal success as the number one universal tooling material. Its special aluminum-titanium alloy composition and method of casting guarantee absolute uniformity and freedom from porosity, distortion and casting defects.

Being extremely stable, weighing 60-70% less than tool steel and possessing high tensile strength, Pioneer 921-T cast aluminum plate meets every precision tooling requirement, and at lower cost. Its versatile application and easy workability save money and man hours, being easily sawed, tapped, milled or welded. Each plate of 921-T is delivered flat, guaranteed within $\pm .005$ " in thickness of $\frac{3}{4}$ " or over.

Don't guess; be sure! Insure the precision of the end product by specifying Pioneer 921-T for such tooling items as form blocks, stretch form dies and jig components. Write or call any Pioneer 921-T distributor for literature, engineering data and prices.

ALBUQUERQUE, N.M.: Morris Steel & Supply Co.
ATLANTA, GA.: Southern States Iron Roofing Co.
BOSTON, MASS.: American Steel & Aluminum Corp.
Joseph T. Ryerson & Son, Inc.
BIRMINGHAM, ALA.: Southern States Iron Roofing Co.
CHICAGO, ILL.: Joseph T. Ryerson & Son, Inc.
CLEVELAND, O.: Kastle Steel Corporation
DALLAS, TEX.: Vinson Steel & Aluminum Co.
DEARBORN, MICH.: Pioneer Aluminum Inc.
DENVER, COLO.: ABC Metals Corporation
DETROIT, MICH.: Kastle Steel Corporation
Meier Brass & Aluminum Co.
GRAND RAPIDS, MICH.: Kastle Steel Corporation
HARTFORD, CONN.: American Steel & Aluminum Corp.
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MIAMI, FLA.: Southern States Iron Roofing Co.
MILWAUKEE, WIS.: Joseph T. Ryerson & Son, Inc.
NASHVILLE, TENN.: Southern States Iron Roofing Co.

OAKLAND, CALIF.: Earle M. Jorgenson Co.
RALEIGH, N.C.: Southern States Iron Roofing Co.
RICHMOND, VA.: Southern States Iron Roofing Co.
ST. LOUIS, MO.: Industrial Metals, Inc.
SOUTH BEND, IND.: Kastle Steel Corporation
UNION, N.J.: Mapes & Sprowl Steel Co.
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PIONEER ALUMINUM INC.

Subsidiary of MORRIS P. KIRK & SON, INC.

PACIFIC COAST UNIT OF NATIONAL LEAD COMPANY

5251 West Imperial Highway • Oregon 8-7621 • Los Angeles 45, California.

TOOLING PLATE
HEATING
PLATENS
VACUUM CHUCKS
EXTRUSIONS

MEN in the NEWS

(Continued from page 41)

Motors Insurance Corp.—Harold E. Beyer has been elected president. George S. Whowell succeeds him as director of branch operations, and Ward Randol has been elected a vice-president and placed in charge of claims.

General Electric Co.—Joseph B. Moorman was appointed commercial sales manager of the Production Engine Dept., and John A. Lawrence was named manager of aviation electrical systems engineering for the Aviation and Defense Industries Sales Dept.

De Soto Div., Chrysler Corp.—M. H. Kehn has been appointed traffic supervisor, and Don Craig has been named special events manager.

Allis-Chalmers Mfg. Co., General Products Div.—Henry F. Banzhaf is now assistant to the general manager.

Bendix Aviation Corp., Montrose Div.—Herbert J. Pyle has been appointed assistant sales manager.

Dayton Steel Foundry Co.—Daniel A. Walther was named chief engineer.

National Lead Co.—Roy Dahlstrom has been appointed director of research.

Minneapolis-Honeywell Regulator Co.—Stephen F. Keating has been made director of all military activities.

Fruehauf International, Ltd.—Alex S. Aranyos has been elected president.

Datamatic Corp.—John R. Lenox has been elected vice-president in charge of operations.

Enjay Co., Inc., Paramins Div.—Brian Casey has been named assistant manager.

Ransohoff, Inc.—Bernard S. Reckseit has been named vice-president in charge of engineering.

Consolidated Electrodynamics Corp., Alectra Div.—Willard T. Holmes was named director of engineering, and Roy K. Stephens was made director of manufacturing.

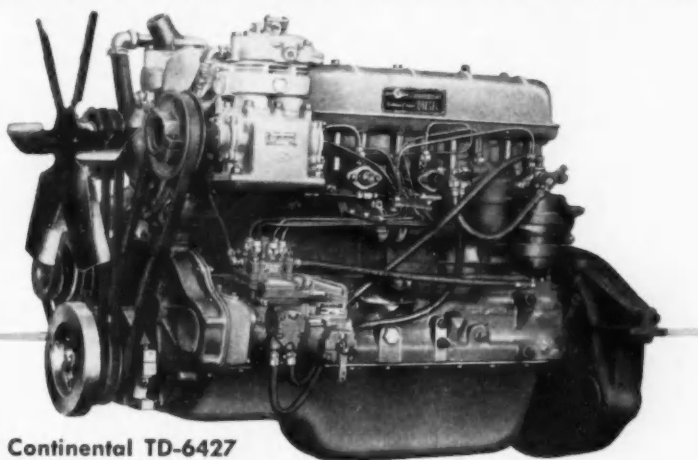
Ramsey Corp.—Hans M. Siverts has been made general sales manager of service.

B. F. Goodrich Co.—Karl O. Nygaard has been appointed director of business research.

Firestone Tire & Rubber Co., Detroit Div.—Gordon C. Applequist has been named manager of manufacturers sales.

(Turn to page 170, please)

Cushioned Power[®] IS SMOOTHER POWER



Continental TD-6427
Cushioned Power Diesel

| TRANSPORTATION DIESEL ENGINES | | | | Bare Engine H.P. | |
|-------------------------------|------|--------|--------|------------------|------------------|
| Model | Cyl. | Bore | Stroke | Displ. | |
| TD6427 | 6 | 4 1/16 | 4 7/8 | 427 | 116.0 @ 2400 RPM |
| RD6572 | 6 | 4 1/4 | 5 1/2 | 572 | 172.0 @ 2400 RPM |
| VD8603 | 8 | 4 1/4 | 4 1/4 | 603 | 182.0 @ 2800 RPM |
| SD6802 | 6 | 5 1/8 | 5 1/2 | 802 | 225.0 @ 2200 RPM |

| TRANSPORTATION GASOLINE ENGINES | | | | Bare Engine H.P. | |
|---------------------------------|------|--------|--------|------------------|------------------|
| Model | Cyl. | Bore | Stroke | Displ. | |
| N4062 | 4 | 2 3/8 | 3 1/2 | 62 | 26.3 @ 3500 RPM |
| Y4069 | 4 | 2 1/2 | 3 1/2 | 69 | 28.0 @ 3500 RPM |
| Y4091 | 4 | 2 1/2 | 3 1/2 | 91 | 36.0 @ 3400 RPM |
| F4124 | 4 | 3 | 4 1/8 | 124 | 47.0 @ 3200 RPM |
| F4140 | 4 | 3 1/16 | 4 3/8 | 140 | 52.0 @ 3200 RPM |
| F4162 | 4 | 3 1/16 | 4 7/8 | 162 | 58.0 @ 3200 RPM |
| F6186 | 6 | 3 | 4 1/8 | 186 | 77.0 @ 3500 RPM |
| F6209 | 6 | 3 1/16 | 4 7/8 | 209 | 90.0 @ 3500 RPM |
| F6226 | 6 | 3 1/16 | 4 7/8 | 226 | 98.8 @ 3500 RPM |
| F6244 | 6 | 3 1/16 | 4 7/8 | 244 | 105.0 @ 3750 RPM |
| M6271 | 6 | 3 3/4 | 4 7/8 | 271 | 96.5 @ 3000 RPM |
| M6290 | 6 | 3 3/4 | 4 7/8 | 290 | 108.0 @ 3000 RPM |
| M6330 | 6 | 4 | 4 7/8 | 330 | 125.0 @ 3000 RPM |
| M6363 | 6 | 4 | 4 3/16 | 363 | 146.0 @ 3000 RPM |
| B6371 | 6 | 4 1/8 | 4 7/8 | 371 | 123.5 @ 3000 RPM |
| B6427 | 6 | 4 1/8 | 4 7/8 | 427 | 142.0 @ 3000 RPM |
| K6271 | 6 | 3 3/4 | 4 7/8 | 271 | 114.5 @ 3200 RPM |
| K6290 | 6 | 3 3/4 | 4 7/8 | 290 | 123.0 @ 3200 RPM |
| K6330 | 6 | 4 | 4 7/8 | 330 | 147.0 @ 3200 RPM |
| K6363 | 6 | 4 | 4 3/16 | 363 | 162.0 @ 3200 RPM |
| T6371 | 6 | 4 1/8 | 4 7/8 | 371 | 143.8 @ 3000 RPM |
| T6427 | 6 | 4 1/8 | 4 7/8 | 427 | 170.0 @ 3000 RPM |
| U6501 | 6 | 4 1/2 | 5 1/4 | 501 | 178.0 @ 2600 RPM |
| R6513 | 6 | 4 1/2 | 5 1/8 | 513 | 192.2 @ 2800 RPM |
| R6572 | 6 | 4 1/2 | 5 1/8 | 572 | 220.0 @ 2800 RPM |
| R6602 | 6 | 4 1/2 | 5 1/8 | 602 | 232.0 @ 2800 RPM |
| S6749 | 6 | 5 1/8 | 5 1/2 | 749 | 250.0 @ 2800 RPM |
| S6820 | 6 | 5 1/8 | 5 1/2 | 820 | 275.0 @ 2800 RPM |
| V8603 | 8 | 4 1/4 | 4 1/4 | 603 | 240.0 @ 3200 RPM |

A tip from fleet operators who have switched to Continental Diesel: When you're ready to "go Diesel," it pays, in more ways than just initial cost, to go the whole distance and get exclusive Red Seal Cushioned Power. In that way, you obtain fullest measure of ALL the advantages identified with engines of Diesel type. You use less fuel than with conventional Diesels. You have more cargo capacity because you're lugging less engine weight. And the wide interchangeability of parts between Cushioned Power Diesels and companion models in the Red Seal gasoline engine line expedites maintenance and sharply reduces parts cost.

AUTHORIZED SERVICE
and genuine Red Seal parts available from
coast to coast.



Continental Motors Corporation
MUSKEGON, MICHIGAN

WORLD'S LEADING INDEPENDENT MANUFACTURER OF INTERNAL COMBUSTION ENGINES, CONTINENTAL MOTORS OPERATES PLANTS IN ATLANTA, DALLAS, DETROIT, MILWAUKEE, MUSKEGON, AND TOLEDO, AND IN ST. THOMAS, ONT., PRODUCING AIR-COOLED AND LIQUID-COOLED ENGINES FOR USE ON LAND, AT SEA AND IN THE AIR.

MEN in the NEWS

(Continued from page 168)

Veet Industries.—**Donald F. Levleit** has been made general manager.

Bulldog Electric Products Co.—**Hugh V. Diamond, Jr.**, has been promoted to sales service manager, and **Charles E. Moran** has been made supervisor of sales and product training.

Ferry Cap & Set Screw Co.—**Donald H. Spicer** has been appointed vice-president for industrial sales.

Four Wheel Drive Auto Co.—**Franklin Lyons** has been elected chairman of the board.

Reliance Electric & Engineering Co.—**William R. Hough**, **Walter H. Haber**, and **Hugh D. Luke** were elected vice-presidents — operations groups. **Richard A. Geuder** was named vice-president for marketing.

American Car & Foundry Div., ACF Industries, Inc.—**Herbert H. Rogge** has been named president.

Champion Spark Plug Co.—**William B. Courtney** has been made assistant export manager.

Wheelabrator Corp.—**James F. Connaughton** was named executive vice-president; **Harold M. Miller**, senior vice-president; **Jacob A. Schmidt, Jr.**, secretary-treasurer; **John M. Wolf**, controller; and **Edward R. Sullivan**, assistant secretary and assistant treasurer.

Transue & Williams Steel Forging Corp., Forging Div.—**Walter Murphy** is now director of manufacturing.

Chandler-Evans Div., Pratt & Whitney Co.—**W. Jerome Peterson** has been appointed chief design engineer.

Harnischfeger Corp., Diesel Engine Div.—**F. C. Langston, Jr.**, has been appointed sales manager.

Modine Mfg. Co.—**Cary Wilson** has been elected vice-president in charge of sales.

Brush Electronics Co.—**Ralph V. Little, Jr.**, is now manager of the Product Engineering Dept.

U. S. Rubber Co., Footwear and General Products Div.—**Edward C. Van Buskirk** has been appointed development manager.

AMP, Inc.—**William Kremer** is now manager of international sales administration.

Westinghouse Electric Corp.—**H. C. McDaniel** has been named director of technical information, and **Robert V. McGahey** was made manager of technical publicity.

Strick Trailers—**William T. Meyrick** has been appointed chief design engineer.

Cloyes Gear & Products, Inc.—**Morris Wright** has been named sales manager.

Joseph T. Ryerson & Son, Inc.—**Robert H. Wasz** was named general manager of the San Francisco steel service plant.

Westinghouse Electric Corp.—**Carroll V. Roseberry** has been made vice-president and manager of the mid-western region.

Diamond T. Motor Car Co.—**Eugene Mench** has joined the Engineering Dept.

Lockheed Aircraft Corp., Georgia Div.—**Roy Mackenzie** is now manufacturing manager; **William B. Rieke**, assistant manufacturing manager; **William A. Benson**, assistant production manager; and **Lee Poore**, production manager.



New standards of lighting dependability are created by the new Tung-Sol Vision-Aid Headlamp. A spot-weld bond, an exclusive Tung-Sol feature, joins two lead wires inside the reflector of the headlamp. Result: a more stable filament assembly that is far less affected by shock and vibration.

Exhaustive laboratory impact tests clearly reveal that these new headlamps stand up under more service abuse than any other headlamp on the market.

Tung-Sol Headlamps conform fully to industry standards: E-Z Aim

Platforms provide quicker, simpler aiming and the improved passing beam which gives up to 80 extra feet of seeing distance make Tung-Sol Vision-Aid Headlamps the finest for both 6 and 12-volt service. You can provide no better illumination for your line of automobiles.

The Vision-Aid 5440-S Headlamp for truck and bus service includes the spot-welded leads, E-Z Aim Platforms and the longer range passing beam as well as re-proportioned filaments, ceramic ruggedizing collar and anti-shock fog cap mounting.

TUNG-SOL®

VISION-AID HEADLAMPS

5040-S 6-VOLTS 5400-S 12-VOLTS

5440-S 12-VOLTS TRUCK

Tung-Sol Electric Inc., Newark 4, New Jersey

Sales Offices: Atlanta, Ga.; Columbus, Ohio; Culver City, Calif.; Dallas, Tex.; Denver, Colo.; Detroit, Mich.; Melrose Park, Ill.; Irvington, N. J.; Newark, N. J.; Philadelphia, Pa.; Seattle, Wash.; Canada: Montreal, P.Q.

MACHINING PERFECTION always starts with the right steel

*Pick exactly the right steel for any job
from J & L's complete cold finished line*



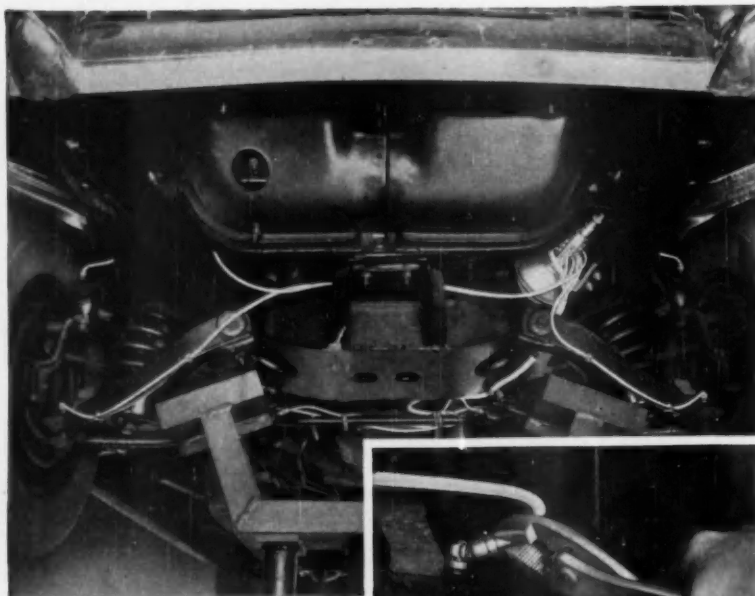
***"Increased valve cap production 31%
with J & L 1113 Bessemer steel"***



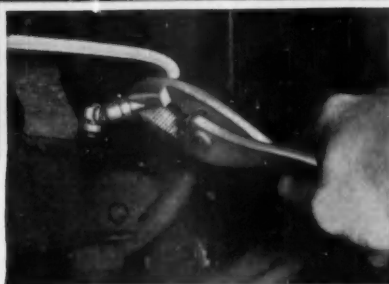
Jones & Laughlin

... a great name in steel

This valve cap for drums requires considerable surface machining, drilling and tapping. Comparison test with the previously used open hearth leaded steel shows J&L "1113" leaded Bessemer steel upped production 31%... permitted change from a 15-second to a 10 $\frac{1}{3}$ -second cycle. Surface finish is smoother. J&L leaded steels assure you higher cutting speeds, longer tool life. Get facts from your distributor or write to Jones & Laughlin, 3 Gateway Center, Pittsburgh 30, Pennsylvania.



AUTOMATIC lubrication system pumps grease through 90' of 1/4" O.D. Nylaflo Pressure Tubing. (Right) Installation is quick and easy. Here, Nylaflo is used with standard metallic flareless fittings.



Nylaflo® pressure tubing helps advance automotive engineering

Nylaflo meets stringent under-hood performance requirements at 40% of the cost of a metal tubing system which would require flexible couplings and intermediate fittings. In addition it proves feasible with standard metallic fittings, required no prebending, is light and safer to use on assembly lines.

NYLAFLOW Pressure Tubing is available in 1000 psi. and 2500 psi. short time burst strengths, which conform to J.I.C. specifications for low and medium pressures. It is a tough, resilient polyamide tubing with these unusual advantages:

- high burst rating at low cost
- extremely long flex and vibrational life

- crush and abrasion resistant
- light, flexible, easy to install
- serves wide temperature range
- corrosion and chemical resistant

Nylaflo is manufactured to conform with Polymer Specification NYT-800. Each batch is tested for burst strength, resiliency, impact and cold brittleness. It is 100% proof pressure tested.

NEW BULLETIN contains complete data on characteristics, properties and applications. Mail coupon for your copy.



THE POLYMER CORPORATION OF PENNA.

Reading, Pa.

Export: Polypenco, Inc., Reading, Pa., U.S.A.

POLYPENCO nylon, POLYPENCO Teflon, NYLAFLOW® and NYLATRON® GS

TRADE MARK



THE POLYMER CORPORATION OF PENNA.

Dept. AA-57

Reading, Pa.

- ☐ Please send me a copy of the NYLAFLOW Data Booklet.
- ☐ Please send me a copy of Polymer Specification NYT-800.
- ☐ Have a NYLAFLOW Representative call.

Name _____ Title _____

Company _____

Address _____

City _____ Zone _____ State _____

Cost Reduction in the Press Room

(Continued from page 64)

in it to insure proper supervision and constant vigilance of the study.

Third step is to prepare a simple form to record the reasons for press downtime, and the losses involved. There are five factors that must be considered each time a press is down.

1. Reason for press stoppage (punch wear or breakage, misfeed, press or die malfunction, etc.).

2. Loss of time involved from the time the press stopped to the time production was resumed (minutes during which no parts were produced).

3. Number of workers involved by reason of the stoppage (press operator, die set-up man, inspectors, foreman, die maintenance men, expeditors, etc.).

4. Number of parts not produced during this stoppage (rate of production times minutes stopped).

5. Dollar value of parts not produced (number of parts not produced during stoppage times dollar value of each part).

Fourth step in the study is to accumulate the data and review all loss factors. By doing this you will determine the major cause and dollar losses presently distorting the efficiency of your stamping department.

Finally, the fifth step is to take action to reduce each of the major causes.

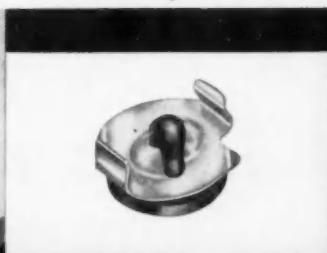
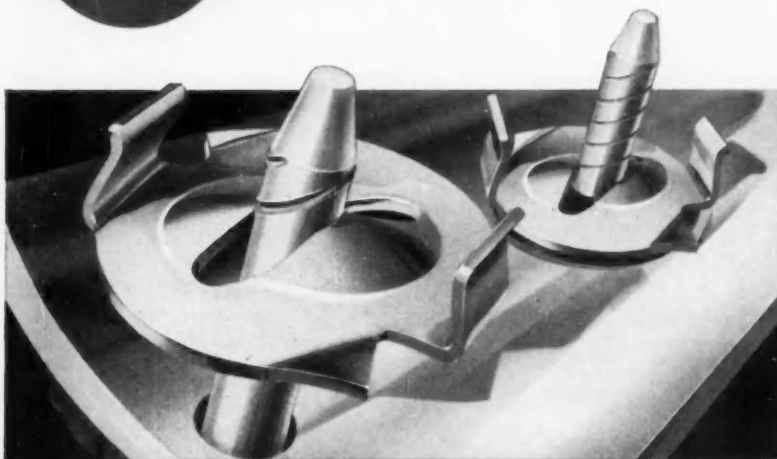
The majority of companies that have followed the procedure reported that problems attributable to broken or dull punches that had to be replaced or resharpened caused most of their press downtime. The next largest loss factor resulted from human error; that is misfeeds, improper nesting of the parts, etc. Several reported that mechanical failures of the press or its accessory equipment caused a fair portion of their press room losses. Failure of the die (either in construction or design) was reported to be a repeated loss factor in some companies.

When the company has determined its loss factor, take some

DOT

THREAD CUTTING FASTENER HOLDS TIGHT TO CURVED SURFACES

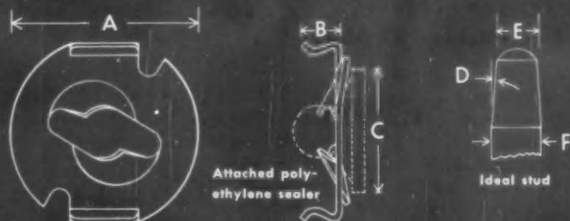
- Low Cost
- Re-Usable
- Self-Locking
- Vibration-Proof
- Spring Take-Up



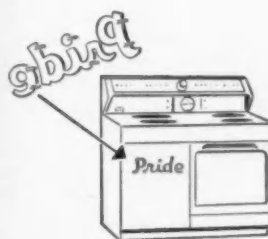
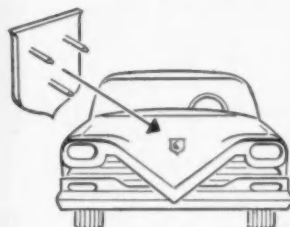
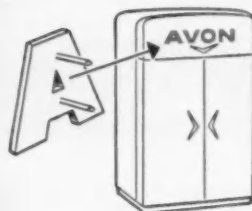
Specially designed to hold die-cast or cold-forged name plates, emblems and trim against sheet metal surfaces . . . DOT'S unique T.C.F. can be used in many other applications which require a spring take-up fastener that pulls up tight without backup on flat or contoured surfaces.

It cuts clean, deep threads on unthreaded studs, even those that are chrome plated. When used with its preassembled plastic sealer, T.C.F. makes a water-tight seal. The sealer precedes the fastener onto the stud so that it is not damaged by the thread-cutting process.

Available in quantity, with or without sealer, to fit 1/8" and 3/16" studs. Drawings available on request for magnetic tool or simple hand tool.



| Nominal Sizes | A | B | C | D | E | F | Driving Torque | Ultimate Strength |
|---------------|------|------|------|-------|--------------|--------------|--------------------|-------------------|
| 1/8" | .560 | .170 | .450 | 6°/4° | .095 .085 | .130 .125 | 7-10 Inch lbs. | 200 lbs. |
| 3/16" | .705 | .200 | .450 | 6°/3° | .160 .150 | .192 .184 | 20-30 Inch lbs. | 400 lbs. |
| 1/4" | .875 | .260 | .625 | 6°/4° | .190 .180 | .255 .245 | 25-30 Inch lbs. | 500 lbs. |



Manufactured by
MONADNOCK MILLS SUBSIDIARY
San Leandro, Cal.

DOT T.C.F.
Patent Pending

Manufactured by
CARA FASTENER CO. DIVISION
Cambridge, Mass.

UNITED - CARA FASTENER CORPORATION

positive steps to reduce press room losses:

If punch failure is your major trouble, run performance tests on the punches of various manufacturers. Contact representatives of the major punch manufacturers in the country and order punches for several of the dies that are effecting your downtime and prepare a simple form to record the results of the tests. Commercial punch manufacturers encourage such tests as a part of their service

because quality varies with each punch manufacturer's products. One company furnished a form for this purpose. It is very important that these tests are properly supervised. The press operator and die set-up man must be acquainted with the purpose of the test and the importance of an accurate report. All personnel on each shift must be informed of the tests, and every precaution must be taken to assure accuracy.

If an abnormal amount of press

downtime is caused from human failure, press room supervision must be held accountable. It is appreciated that human error will never be completely eliminated. However, many mechanical attachments now available on the market to reduce the possibility of these should be thoroughly investigated. In addition to this, educational programs for press operators can pay off to a great extent.

If mechanical failure of the press is the predominant cause of your press downtime, then it is highly recommended that the costs of downtime losses be accumulated and extended over a normal depreciation period to study the benefits that can be derived from a capital expenditure or rebuilding or purchasing new equipment.

If failure of the die contributes too much of your press downtime, then your tool design, tool room and your tool vendors must be consulted and instructed. No die, punch or press will perform to its capacity if punch and die alignment does not exist. Parts will burr prematurely and punches and dies will wear excessively on one side. This will necessitate punch and die button replacement. The main causes of this malfunction are improper building of the die or lack of concentricity in the replacement punches. The other factor about die construction to insure proper functioning of the die is the necessity of adequate stripping pressure.

If your company experiences abnormal punch breakage, look for the possibility of a malfunction in your stripping cycle. Pressure or spring type strippers, with adequate holding pressure, hold the part absolutely firm during the perforating and stripping cycle. This prevents cocking of the part. If the part is not held firmly this cocking will cause stresses on the punch point that will result in premature punch breakage.

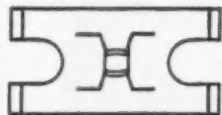
The cost of a capital equipment for the press room is proportionately one of the largest expenditures in a multi-operation metal-working plant. New presses can cost anywhere from \$1000 to \$140,000 and probably a fair average to consider would be \$15,000 per unit. The same is true of die

THIS Fastener works every time!



**FAST, FOOLPROOF
ASSEMBLY!**

**TIGHT,
RATTLEPROOF GRIP!**



Four Gripping Teeth provide maximum gripping action, even on hard chrome studs.



Long, High Spring Arch maintains tension in service; compensates for wear on parts.



Turned Up Ends slide smoothly over body deadener, radio grilles and plastic surfaces without digging.

Write for free samples, stating size, material, finish

TYPE "H" PUSHNUT® FASTENERS

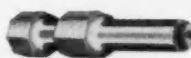
**For unthreaded studs of
Ornaments — Nameplates — Emblems**

The improved design of Type "H" PUSHNUTS brings you ease and speed of application—savings on assembly costs—security of fastening never before achieved on unthreaded studs. With all their advantages, PUSHNUTS are very low in price. Made of tempered spring steel in plain, parkerized and cadmium finishes. Sizes for $\frac{1}{16}$ ", $\frac{3}{32}$ " and $\frac{1}{8}$ " studs. Have our fastening engineer demonstrate—or run your own tests.

Fast, Positive Assembly



Manual Applicators



Power Tool Shanks

Magnetic and non-magnetic

THE PALNUT COMPANY 60 Glen Road, Mountainside, N. J.

Subsidiary of United-Carr Fastener Corp.

Regional office and warehouse: 730 West Eight Mile Road, Detroit 20, Mich. Tel. JORDAN 4-6087



Nature's Torture Chamber proves Skinner Solenoid Valves can really take it!

Our laboratories put each Skinner Solenoid Valve through every conceivable test, but the real proof is given by trucks, buses, and farm, construction and materials handling equipment in all areas of operation—in the cold of the Rockies, the heat of the desert, the splash of rain and dirt, and the shock of rough roads in normal service.

Each day thousands of standard and specially designed Skinner Solenoid Valves are performing in the main arteries of hydraulic and pneumatic systems—controlling pressure—and vacuum-operated mechanisms. They do their jobs without a falter.

These valves are not only the finest you can buy, but they offer exceptional conveniences and safety features. Such features as stainless steel internal parts, soft syn-

thetic inserts and spring-loaded plungers assure long life without fear of leakage or sticking. The valves are bubble-tight and designed to permit mounting in any position. UL-approved coils, standard or waterproof, will last indefinitely.

You'll find many profitable uses for Skinner Solenoid Valves—to control the operation of cylinders, diesel racks, clutches, brakes, governors, transmissions; in heating, refrigerating, truck and passenger car air conditioning, fuel and air suspension systems—just to name a few.

If you have a control problem, write us at **Dept. 339** and we will put an engineer to work solving it today.

Remember, Skinner Solenoid Valves are "built to take it," whether the going is smooth or tough.

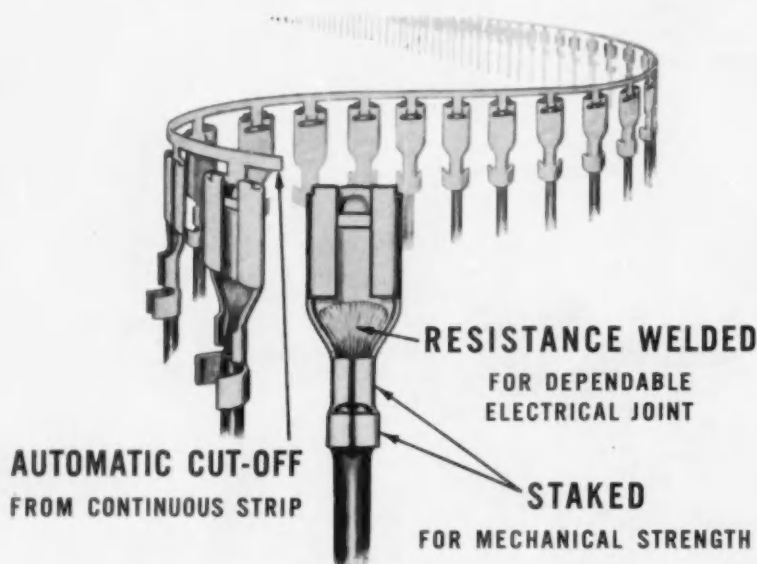
Consult your Classified for the Skinner Factory Representative nearest you.



THE CREST OF QUALITY

SKINNER

**ELECTRIC VALVE
DIVISION** NEW BRITAIN
CONNECTICUT
105 EDGEWOOD AVENUE

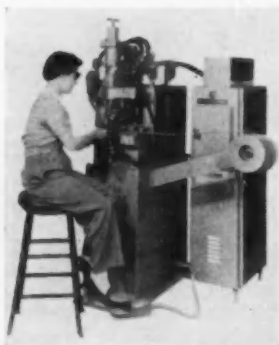


QUALITY ELECTRICAL TERMINALS

----- 3500 PER HOUR

A Taylor-Winfield resistance welder combines 3 rapid operations to mass-produce terminals having positive electrical connection and enduring mechanical strength. These terminals are installed as original equipment in low voltage electrical circuits, such as automobiles, aircraft and communication systems.

The welder automatically indexes each terminal through welding, staking and cut-off stations at a rate of 3500 per hour. The resistance weld insures a strong, low-resistance electrical bond. Mechanical staking clamps the wire and insulation firmly to the terminal, absorbing any service strains.



The operator inserts a lead wire into the loading slot and steps on a pedal switch, performing all three operations simultaneously. The terminals are automatically fed into the welder in strip form as the cut-off shear separates each completed terminal.

If your unit assembly cost is high, take advantage of Taylor-Winfield's experience in welding techniques and machine design. Contact the nearest Taylor-Winfield sales office, listed below.



TAYLOR-WINFIELD Corporation
WARREN, OHIO

ELECTRIC RESISTANCE AND ARC WELDING MACHINES

Sales and Service

CHARLOTTE • CHATTANOOGA • CHICAGO • CLEVELAND • DALLAS
DAYTON • DENVER • DETROIT • LOS ANGELES • PHILADELPHIA
PORTLAND, OREGON • ST. LOUIS • STAMFORD
OAKVILLE AND WINDSOR, ONTARIO



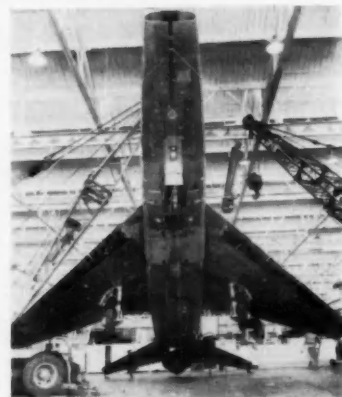
costs which are proportionately high. From experience obtained in various study, each of the major causes of press stoppages have been reduced by very nominal expenditures, educational programs or revisions in sources of supply for perishable tooling. The cost of a "press downtime study" is also negligible because it only entails a coordinated and cooperative effort by certain supervision and can be undertaken by the department in your plant responsible for production engineering or efficiency.

Dow Reports Record Sales For Its 1957 Fiscal Year

Dow Chemical Co. has reported record sales of \$627,819,059 for its 1957 fiscal year which ended May 31. This represented a gain of 11 per cent over the previous year's sales of slightly more than \$565 million. Approximately \$7 million of income from other sources brought the company's total income to \$634,685,548.

Earnings after taxes were the second highest in its history, but at \$53.1 million were down 11 per cent from the previous year's record figures of \$59.7 million.


SABRE STANDS ON NOSE



Supersonic F-100D Super Sabre fighter stands almost vertical in tests performed at North American Aviation to determine its vertical center of gravity. Engineers with transits measured the precise crossing point of vertical lines descending from the point of suspension at each position. Crossing point of the three lines gave them the exact vertical center of gravity. Plane's horizontal center was determined by weight measurements.



Need Seamless Steel Tubing Immediately?



Get "out-of-stock" delivery Call your USS Shelby Seamless Distributor!

WHY WAIT FOR DELIVERY when you can get all the top-quality Seamless Steel Tubing you need from your close-at-hand USS Shelby Seamless distributor?

Phone him, write him, drop in and see him—and you'll get prompt, courteous and efficient service, the likes of which you've never seen before.

- The consistent high quality of USS Shelby Seamless Tubing, its dimensional accuracy and superior machining char-

acteristics make it easy to fabricate. Use it and cut tool costs, reduce rejects, save both time and money, and turn out a finer product.

- Shelby Seamless is available in round, square, rectangular, and other special shapes in any commercial size—from $\frac{1}{4}$ " OD to $10\frac{3}{4}$ " OD and in wall thicknesses from .035" to 2.000" . . . in a wide range of steel grades and anneals.

— Contact your Shelby Seamless Distributor now! —

NATIONAL TUBE DIVISION, UNITED STATES STEEL CORPORATION, PITTSBURGH, PA.

(Tubing Specialties)

COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY • NEW YORK



SHELBY SEAMLESS MECHANICAL TUBING



UNITED STATES STEEL

Armco Develops New Steel for Aircraft and Missiles

ARMCO STEEL CORP. has developed a new high-strength stainless steel, known as Armco PH 15-7 Mo, for future aircraft and missiles. The new aircraft material will be used mainly for skins and major structural parts. According to company

spokesmen, PH 15-7 Mo provides the best combination of characteristics for aircraft and missiles flying up to 2700 mph of any metal available today.

In addition to its high strength at supersonic speeds and low cost, the new steel's outstanding quali-

ties are assured production in volume, ease of fabrication and corrosion resistance.

As planes fly faster, heat from air friction robs aircraft materials of their strength. The unofficial speed record holder, the experimental X-2 rocket plane, encountered a scorching 700 F at 2260 mph. Planes utilizing PH 15-7 Mo will be able to fly in air friction heat of 1000 F, hitting speeds of Mach 4 (2720 mph).

PH 15-7 Mo is said to be the most outstanding development in precipitation hardening stainless steels since Armco began pioneering in these alloys in 1948. The cost of PH 15-7 Mo is less than one-tenth that of high-strength titanium alloys.

Armco is spending approximately \$70 million for improvement and expansion of its Butler, Pa., works to speed production of the new steel and other highly specialized steels.

Within the last five years, aircraft and missiles have become the second largest consumers of stainless steel. Approximately \$75 million worth of stainless steel went into aircraft and missiles in 1956.

Although the production pattern of air weapons is difficult to predict right now, Armco's market analysts are convinced that within the next five years the aircraft and missile industry can become the top user of stainless steel, taking some \$200 million worth annually.

The Ph in PH 15-7 Mo stands for precipitation hardening while the rest of the identification means 15 per cent chromium, 7 per cent nickel and a small percentage of molybdenum. The new steel is made in conventional electric furnaces and rolled on continuous strip mills, thereby making it available in commercial quantities at an economical cost.

Another advantage of PH 15-7 Mo and the other Armco precipitation hardening steels is that they can be easily fabricated and then hardened by heat treatment. Prior to the introduction of the PH grades of stainless steel by Armco, all chromium-nickel stainless steels could be hardened only by cold working. The more the metal was worked, the harder it became and

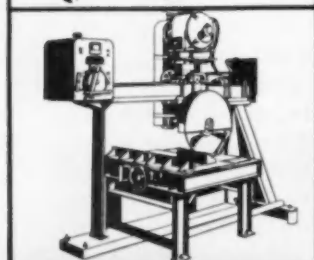
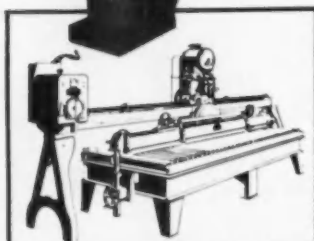
HIGH-SPEED SAW WITH CLAMP TABLE MAKES IRREGULAR SHAPE CUTS



WRITE FOR
FREE
CATALOG

LOW INVESTMENT SAW CUTS METAL FAST & CLEAN

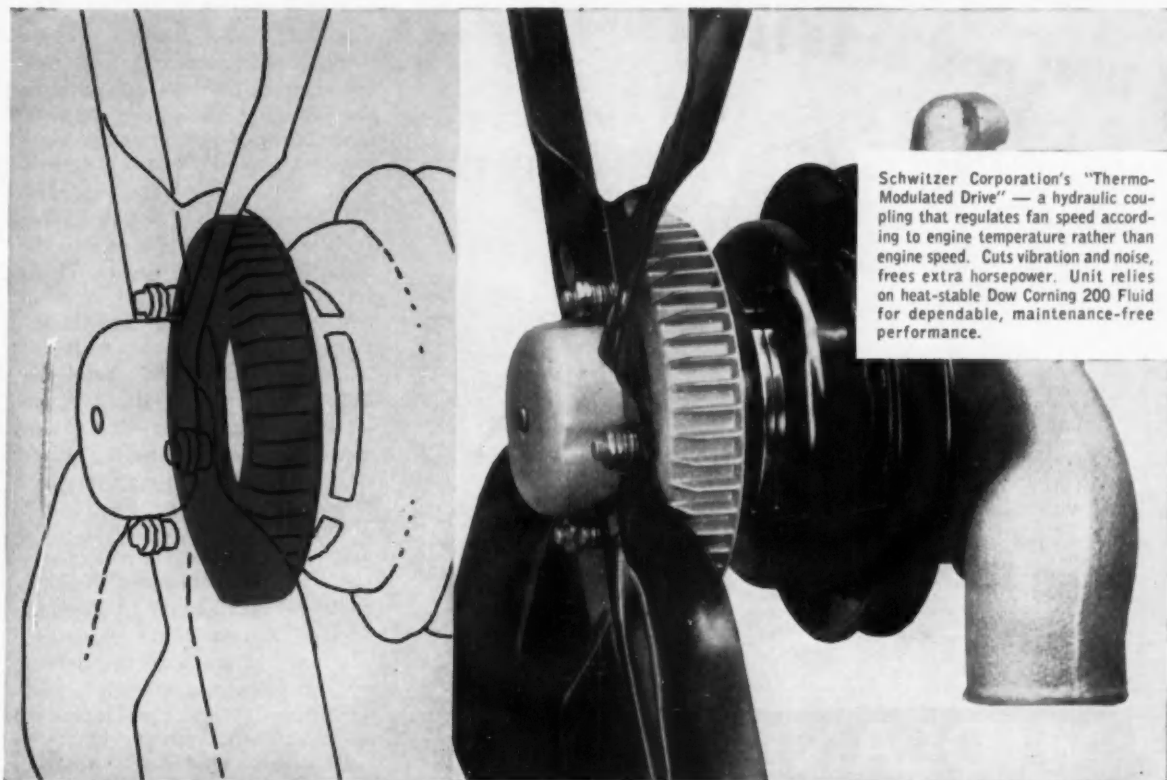
Whether you're making straight cuts, odd angle cuts or irregular shapes such as turbine impeller blades, you'll find the Ty-Sa-Man 144 BD combination of speed and amazing accuracy will save you money. Table has positive air-driven clamps to hold material in any position. Other Ty-Sa-Man cut-off models from 10" to 58" cuts . . . long-cut saws for 4' to 60' cuts, with or without cross movement, for friction or abrasive sawing.



Ty-Sa-Man

MACHINE COMPANY

1006 WHITE AVE., KNOXVILLE, TENN.



Schwitzer Corporation's "Thermo-Modulated Drive" — a hydraulic coupling that regulates fan speed according to engine temperature rather than engine speed. Cuts vibration and noise, frees extra horsepower. Unit relies on heat-stable Dow Corning 200 Fluid for dependable, maintenance-free performance.

Dow Corning Silicone Fluids

break the THERMAL BARRIER!

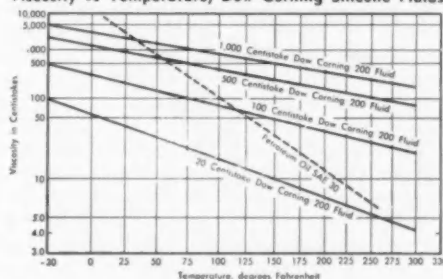
Whether it's your current design or an idea still in the development stage — if practical application is limited by problems of thermal stability, there's a good chance you'll find a solution in Dow Corning 200 Fluids.

These inherently heat-stable silicone fluids maintain near constant viscosity and damping force over broad spans of temperature and time. Highly resistant to oxidation and permanent shear break-down, they are serviceable from -40 to 400 F.

Among today's many successful applications for 200 Fluid in the automotive industry are crankshaft vibration dampers, hydraulic couplings, dashboard instruments, dashpots, pneumatic springs and truck scales. How about *your* application?

Technical assistance in applying Dow Corning 200 Fluids is yours for the asking with no obligation, of course.

Viscosity vs Temperature, Dow Corning Silicone Fluids



Get this **FREE BOOKLET** on Dow Corning 200 Fluids — gives complete data on properties, performance, applications. Write Dept. 0621



first in
silicones

Dow Corning CORPORATION
MIDLAND, MICHIGAN

ATLANTA BOSTON CHICAGO CLEVELAND DALLAS DETROIT LOS ANGELES NEW YORK WASHINGTON, D. C.

THERE MUST BE AN EASIER WAY



MIDLAND

WELDING NUTS

The Midland Steel Products Company is constantly developing new, progressive ideas to improve the efficiency of its fine products. It pioneered the *Midland Welding Nut*, for example, and so successful was this application in its own shops that this labor-saving device has been made available to others.

If you are a manufacturer of metal parts or products and have fastening, fabricating or assembling problems, you may find Midland Welding Nuts just the solution you've been looking for. The Nuts are easily welded into position for the lifetime of the product. You can be assured of correct fit, even in the most awkward, hard-to-reach places. Bolts turn easily into the applied nuts. Thus, heretofore two-man operations can be handled by one man in most instances. Weld-nut equipped parts will be preferred by your customers for they will find them cost-saving and trouble-free, cutting down assembly time. Too, you can be sure that your parts will be properly assembled without the risk of rattles.

A few minutes' time in checking the assembly problems of your customers will be profitable to you. Midland Welding Nuts are low in cost, can give you a definite advantage over competition. This practical application is recognized internationally and endorsed by many designers of the finest products.

The MIDLAND STEEL PRODUCTS COMPANY

6660 Mt. Elliott Avenue • Detroit 11, Michigan
Export Department: 38 Pearl St., New York, N. Y.

Automobile and Truck Frames • Air and Vacuum Power Brakes
Air and Electro-Pneumatic Door Controls

the more difficult it was to fabricate.

The aircraft industry was quick to recognize that the precipitation hardening stainless steels were the most easily fabricated high-strength steels available. Shortly after Armco introduced its first PH steels—17-7 PH and 17-4 PH—in 1948, sales of PH steels to the aircraft industry began rising steadily. Thousands of tons of PH steels have been used in numerous military planes, including the F-86 Sabre Jet, the F-100 Super Sabre, the F-102A, America's fastest fighter—the F-104 Starfighter and the B-58 Hustler, the nation's first supersonic bomber.

The expanded use of 17-7 PH and 17-4 PH by airframe and missile manufacturers poses questions as to the availability of adequate supply. In view of the importance of these materials to the defense program, Armco will grant licenses to interested steel producers to make and sell these alloys.

The expanded facilities for production of PH 15-7 Mo at Butler, Pa., will include one of the most powerful 54-in. hot strip mills in the world, with a new Sendzimir cold reduction mill for finishing 48-in. wide cold rolled stainless steel coils to precision thicknesses.

The new equipment will enable Armco to produce thinner, wider and flatter sheets of stainless steel rolled to the closer-than-standard tolerances required for aircraft and missiles of the future.

Dry Compressed Air

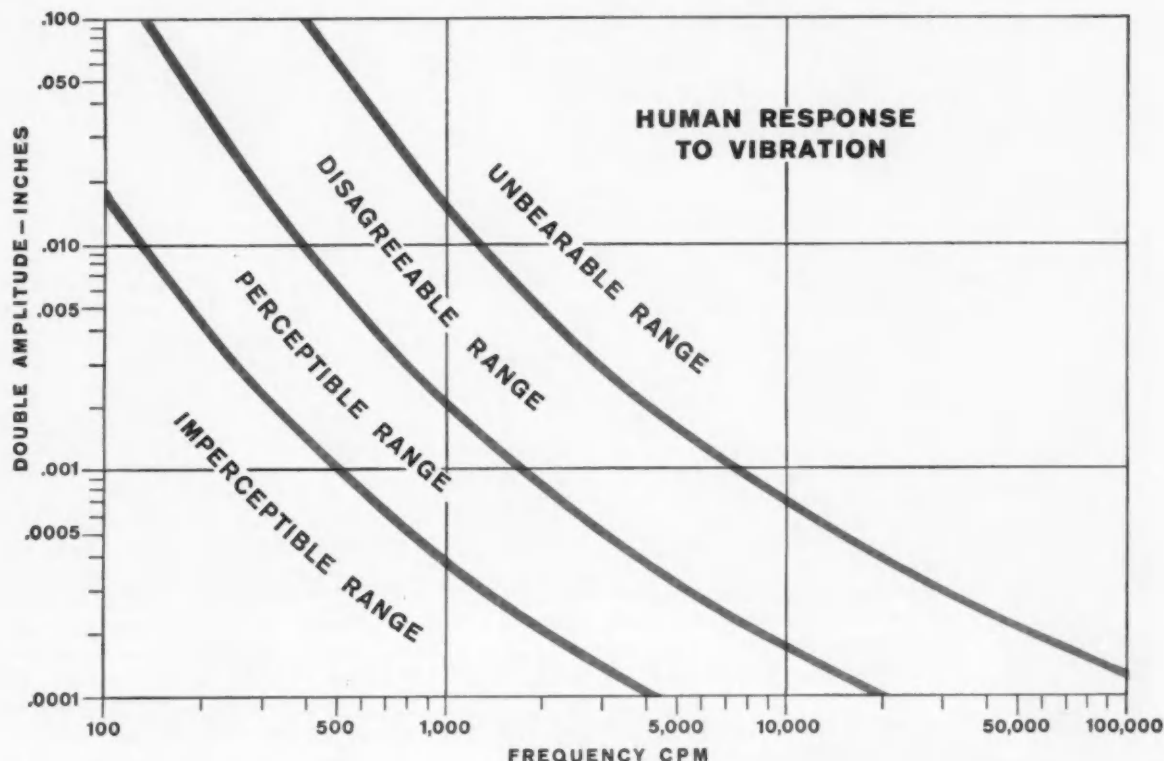
(Continued from page 59)

horizontal receivers. The entrance should be at the head; the outlet should be in the shell, on the top side near the head. A bottom drain is also required.

Air lines must be large enough to handle demands from machines and services without excessive pressure drop. These lines should be slightly pitched so that any moisture that condenses will flow in the same direction as the compressed air. At the end of the line, or at a low point in the line, a drop

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sidered from the functional and economic viewpoints by our experienced Product Design and Industrial engineers. This staff is fully backed up by Research and Manufacturing personnel and facilities second to none in the field.

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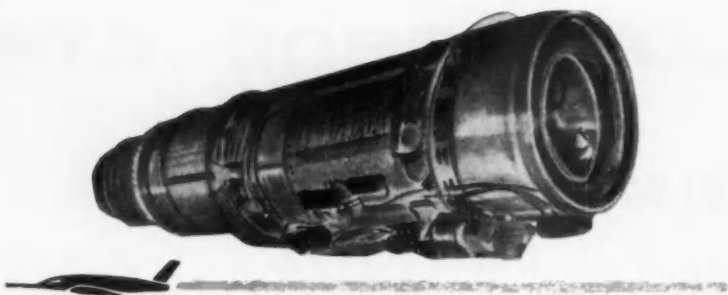
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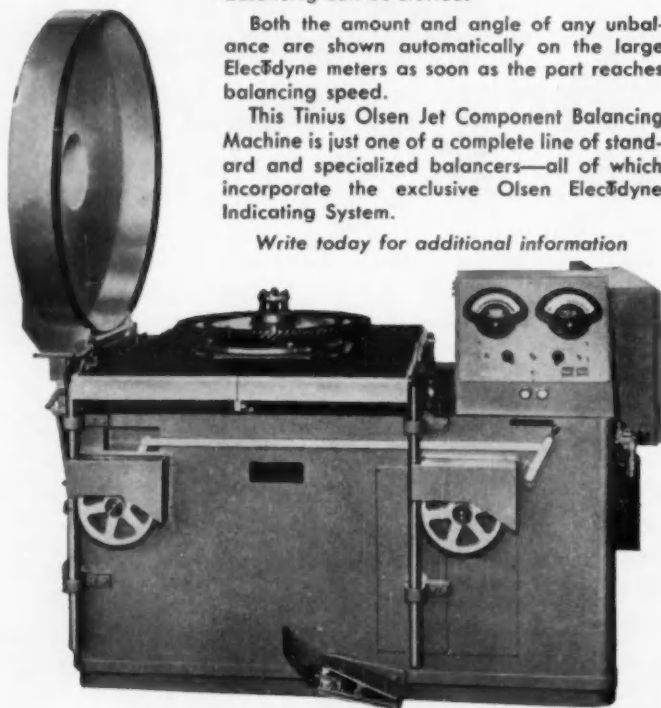
Whirling at speeds in excess of 10,000 rpm, turbine and compressor stages within modern jet engines must be accurately balanced to check destructive vibration.

Tinius Olsen has led in the development of specialized machines that balance jet turbine and compressor stages with unmatched accuracy and at maximum production rates. Awkward, manual handling of parts is eliminated by this conveyORIZED machine. Complete safety is assured by the air operated shroud which must be lowered before balancing can be started.

Both the amount and angle of any unbalance are shown automatically on the large ElecDyne meters as soon as the part reaches balancing speed.

This Tinius Olsen Jet Component Balancing Machine is just one of a complete line of standard and specialized balancers—all of which incorporate the exclusive Olsen ElecDyne Indicating System.

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One of the compressor stages of a jet engine is set for rapid accurate balancing on an Olsen ElecDyne.



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TESTING MACHINE COMPANY
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Testing and Balancing Machines

leg should be installed to collect condensate. Either a hand valve or an automatic trap can be used to drain this leg.

Service lines for tools or services should be taken from the top of the main. Although this arrangement usually requires the use of two elbows, it will guarantee that air taken from the main will be dry. Any condensate in the main will flow by on the bottom. Use a check valve wherever there is any chance of liquids backing into the system from other sources, such as in air-purging systems. To remove any remaining water from the air before use, a moisture separator is usually installed in the service line immediately ahead of the point of use. The air will then be practically dry.

Completely dry air can be obtained by reducing the dew point of the air—before distribution—to a value lower than the lowest temperature that the air will encounter in any part of the system.

An aftercooler consisting of a nest of tubes in a shell can be used for dewpoint reduction. Compressed air is passed through the tubes and cold water is circulated over and around them. Aftercoolers may be mounted either vertically or horizontally for best space utilization or simplest piping. Water flows through the aftercooler in a direction counter to the air flow, so that the water inlet is at the air discharge end of the cooler. Automatic valves may be used to control the water flow. Discharge water from the aftercooler can then be used for compressor cooling. This slightly cooled water is better for this service than extremely cold water.

Air from the aftercooler enters the head of the receiver and the drops of water fall to the bottom where they are drained out. A thermometer in the cooler outlet permits the operator to make certain that the correct amount of cooling water is being used. For protection, a pop safety valve must be placed between the compressor and the aftercooler, or any possible source of obstruction in the air lines.

The proportions of a good aftercooler are such that the air will be



4-star feature with Drive-in Movies... **SPEED NUTS®** simplify heater maintenance

Right from the start, the Electromode Division of Commercial Controls Corporation, Rochester, designed Tinnerman SPEED NUTS into their new electric car heaters for drive-in theaters. SPEED NUTS provide efficient, economical attachments that simplify servicing and give Electromode a powerful sales advantage with theater owners.

Four "U" Type SPEED NUTS hold the weather-tight steel cover firmly in place. SPEED NUTS eliminate the need for welding, staking or tapping. Self-retained, they stay in position even when the cover is removed for inspection or servicing. They "float" in the panel to offset hole misalignment. And because of their unique design, SPEED NUTS never rust or freeze to screw threads even under prolonged outdoor exposure.

This is a prime example of the advantages gained by designing with SPEED NUT Brand Fasteners in mind. Peak fastening efficiency is built in—no need to invest in high-cost tooling at the start, or to make revisions to cut costs later. Call in your Tinnerman representative now to discuss your new

design projects. He can help you save time and money without sacrificing product quality. His office is listed in most major telephone directories. Or write to:

TINNERMAN PRODUCTS, INC.
P. O. Box 6688 • Dept. 12 • Cleveland 1, Ohio



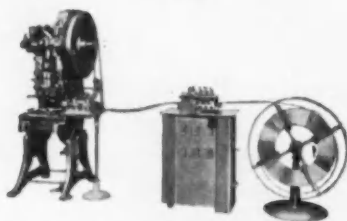
CANADA: Dominion Fasteners Ltd., Hamilton, Ontario. GREAT BRITAIN: Simmonds Aerospace Ltd., Treforest, Wales. FRANCE: Simmonds S. A., 3 rue Salomon de Rothschild, Suresnes (Seine). GERMANY: Mecano-Bandy GmbH, Heidelberg.

FLEXIBILITY in Stock Straightening



WITTEK STOCK STRAIGHTENERS

Used in conjunction with a reel stand and automatic feed for punch presses, the Wittek Stock Straightener is a self-contained, motor-driven unit designed for maximum efficiency in the continuous straightening of coiled stock. Standard models handle stock with widths up to 12 inches. An infinitely variable speed drive permits any desired straightening speed so that the proper slack is maintained in the straightened strip between the unit and the press feed.



This typical Wittek automatic production feeding setup includes—Wittek roll feed mounted on the punch press, Wittek stock straightener, and Wittek self-centering reel stand.

Write for full particulars
WITTEK Manufacturing Co.



4319 W. 24th Place • Chicago 23, Illinois

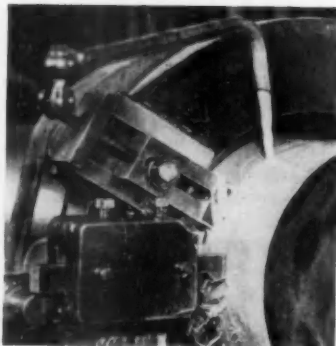
cooled to within 10 F of the cooling water temperature with a flow of one to two gallons of water per minute for each 100 cu ft of air that is compressed to 100 psi.

Any water carried through the receiver can be removed by a moisture separator. One type consists of a cylindrical chamber into which the air flows tangentially, producing a swirling motion. The drops of water, which are heavier than air, are thrown to the walls of the chamber. From here they run down into the drain at the bottom of the separator, where they are expelled automatically by a trap, or manually by a valve. The air flows through a filter made of porous material which permits the passage of air, but prevents the passage of water and oil.

When the separator is located at the outlet of the aftercooler, it may be overburdened, for it will have to remove all of the moisture. It is better practice to place it in the line from the air receiver. When this is done, much of the moisture will first drop out in the receiver, leaving less work for the separator. The result will be drier air.

By realizing these characteristics of compressed air, and by properly applying the drying techniques discussed here, it should be possible to eliminate costly water from practically any compressed air system. Paint jobs will be improved, sand blasting will be more efficient.

FINISHING TOOL



High-speed steel finishing tool is mounted in tool block on back of special ring-type follow rest in a 32 in. LeBlond lathe for skinning large steel pipe rolls at Beloit Eastern Corp. The rolls are roughed, finished and polished at one time.



Panalarm Annunciator pinpoints process "off-normals"

In the process industries and among users of automatic machinery, trouble is minimized when it's caught early. That's the purpose of the Panalarm Annunciator System — a continuous monitor of your process.

One typical adaptation of the modular Panalarm system is engineered to differentiate between the first "off-normal" and subsequent "off-normals" caused by the first. This feature allows instantaneous recognition of the prime source of trouble in a "chain reaction."

Another adaptation is designed specifically for motor start-up and shut-down. It has also been successfully adapted for supervisory control, pump control and programming.

Your Panalarm sales engineer will be happy to make a survey of your requirements to determine whether a Panalarm system can aid productivity and safety in your process. For electrical and mechanical data on standard systems, request Catalog 100B on your letterhead.



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Engineered Information Systems for Industry



**NEW, AUTOMATED McKAY RIM
LINE SPEEDS PRODUCTION
OF PRECISION WHEELS FOR
TUBELESS TIRES**

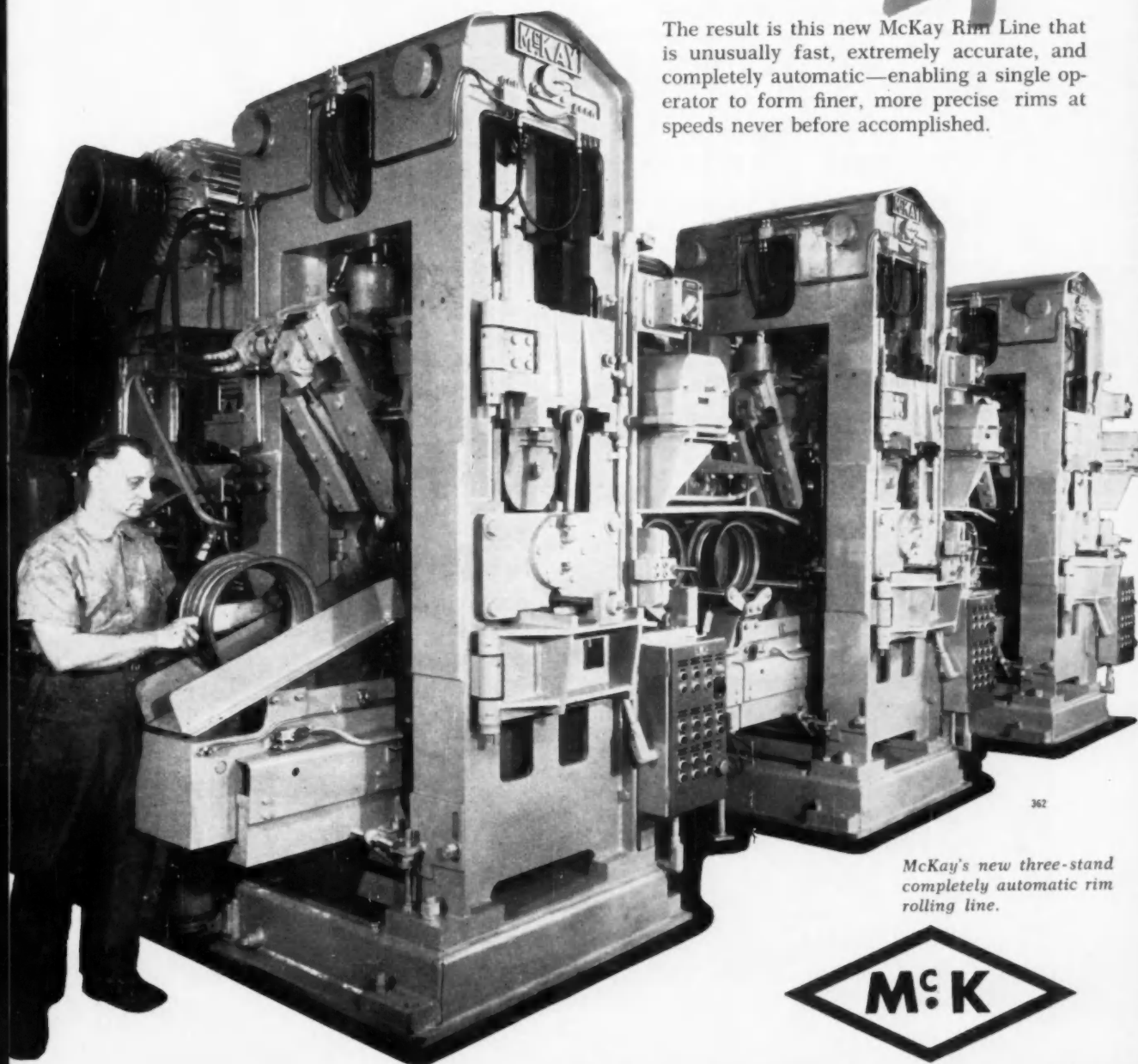
The advent of the tubeless tire, coupled with ever increasing labor costs, pushed wheel manufacturers to request machines that could turn out better rims at faster rates.

Because McKay Machine engineers know this business better than any other group in the nation, they accepted the challenge.

BETTER RIMS

...automatically

The result is this new McKay Rim Line that is unusually fast, extremely accurate, and completely automatic—enabling a single operator to form finer, more precise rims at speeds never before accomplished.



362

McKay's new three-stand
completely automatic rim
rolling line.



THE MCKAY MACHINE COMPANY • YOUNGSTOWN, OHIO

as **LIGHT** as aluminum
— **WEARS** like iron

Unretouched photo of VANASIL piston

MICRO-X VANASIL pistons have run way over 200,000 miles with only .002" to .005" wear on the top ring grooves. How much wear develops in top ring grooves on the pistons you are using—in 100,000 miles? In 200,000 miles, if they are ever run that far?

Do your owners have rings break because of badly worn grooves, causing a breakdown on the road and a costly tow-in job as well as lost time and an engine overhaul? *Vanasil Pistons reduce top ring groove wear up to 75%!*

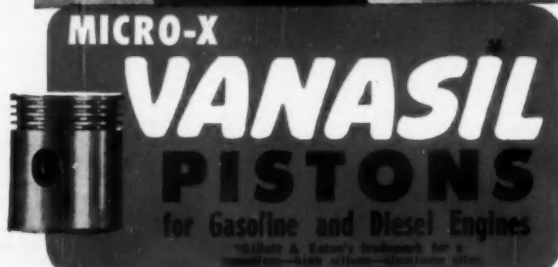
**You Get ALL these Advantages only in
VANASIL PISTONS**

Patented Vanadium — Silicon — Aluminum Alloy

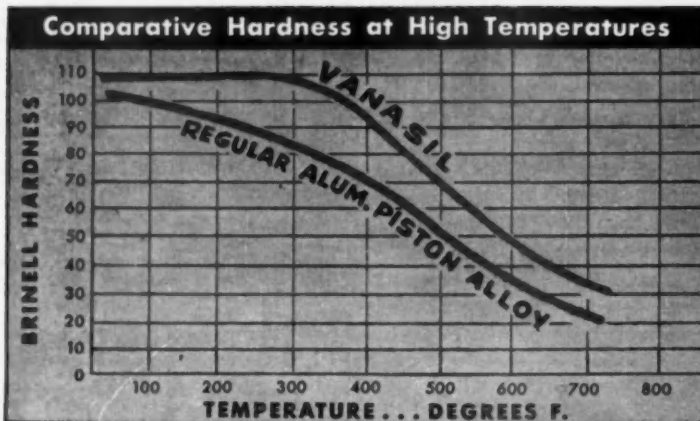
1. **LIGHT WEIGHT**—Same as other aluminum alloys.
2. **SCORING, SCUFFING MINIMIZED**—Because of "Oil-absorbing" microscopic porous texture.
3. **LONGER LIFE** — 30% less friction — 30% harder, outwears other aluminum alloys several times.
4. **TOP RING**—Breakage virtually eliminated because of reduced ring groove wear.
5. **LOW EXPANSION**—Characteristics of Cast Iron.
6. **CLOSE CLEARANCES**—Fitted with Cast Iron Clearances.
7. **SOLID SKIRT DESIGN**—No expansion devices required.
8. **HIGH HEAT CONDUCTIVITY**—Similar to other aluminum alloys.
9. **GRAIN GROWTH**—None.
10. **PLATING**—No tin or other break-in coating required.

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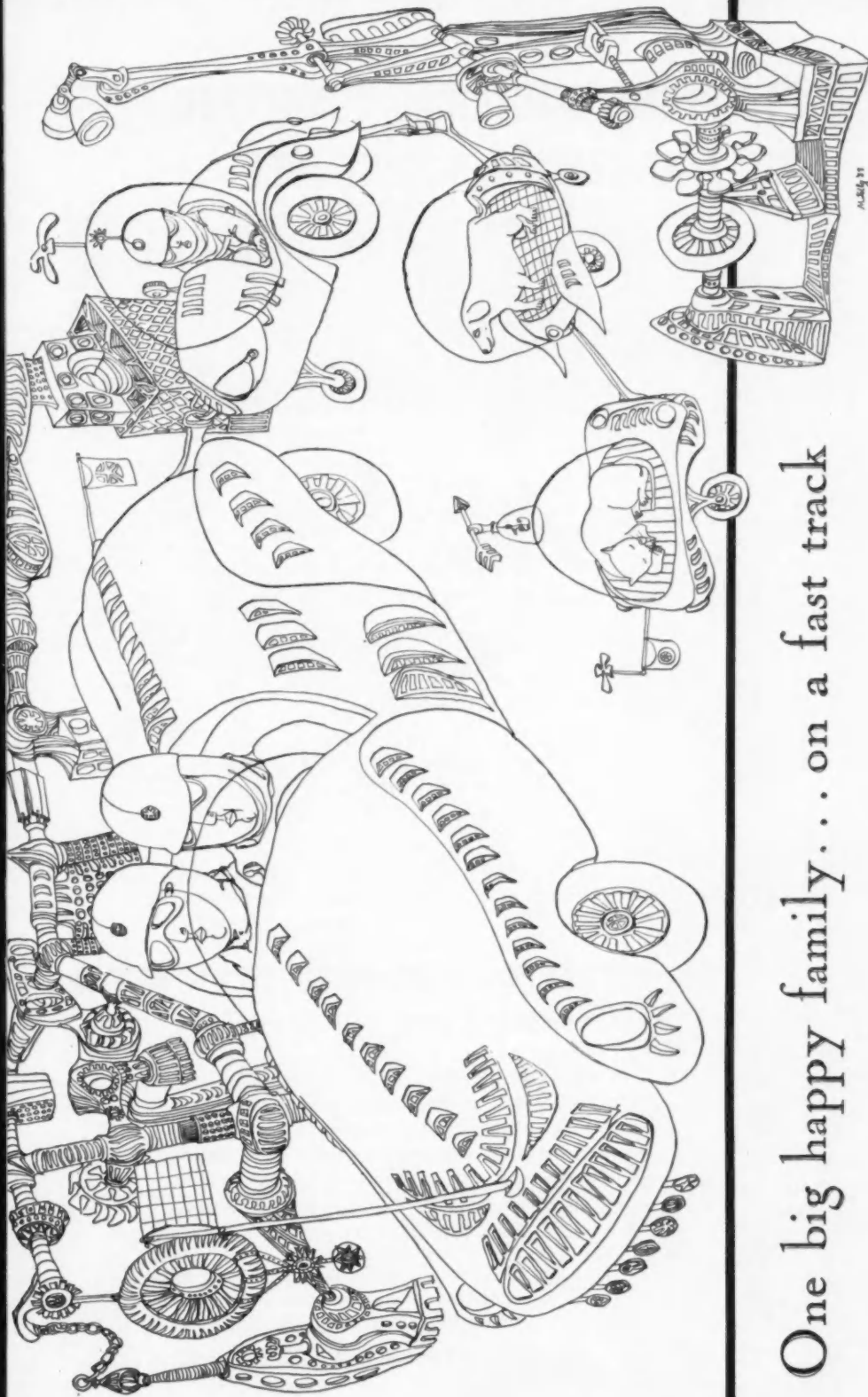
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Name

Firm Name

Address





Drawing by Marie Tuicillo Kelly.
Reproductions available on request.

One big happy family... on a fast track

The drawing is strictly for enjoyment, designed to tickle your fancy. We think it does a nice job of poking gentle fun at the exurbanite sports car set—homo americanus crampiusus.

What we really want to talk about is the Stainless Steel you see on *all* cars. No other metal resists denting and corrosion so well. No other metal can keep its luster for so long. And Stainless

**With bouquets to McCall's*

trim is often cheaper to fabricate than plated parts.

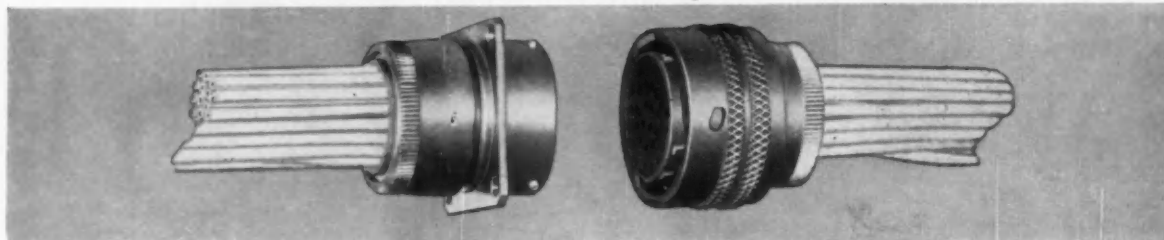
You'll enjoy buying Stainless from United States Steel because we think the customer is always right, and we've got a whopping variety of Stainless Steel grades, types and finishes. If you'd like a reproduction of the above drawing for framing, write to United States Steel, Room 2801, 525 William Penn Place, Pittsburgh 30, Pa.

USS STAINLESS STEEL





"PT" PYGMY ELECTRICAL CONNECTOR WITH 5-KEY POLARIZATION, 3-POINT LOCK



Positive locking feature eliminates safety wiring

The new Bendix* "PT" connector represents the greatest advance yet achieved in miniature connector design. It incorporates more exclusive features than any miniature connector on the market. Here are a few of the things that make the Bendix "PT" outstanding in the connector field today:

- Safety wiring completely eliminated
- Mechanically assisted coupling and uncoupling through cam action
- Visual and audible inspection of coupling—perfect for "blind" locations
- Three-point bayonet lock; perfect axial alignment of mating parts at all times
- Constant spring tension behind mated insert faces
- Five key polarization—positive protection against mis-mating or cross-plugging
- Resilient inserts, performance-proved in millions of Bendix connectors over the past ten years
- Heavy gold plating over silver on all contacts
- Closed entry, probe-proof socket contacts

- Both pin and socket contacts machined from high-grade copper alloy
- Machined bar stock or impact-extruded shell components cadmium-plated to QQP-416; olive drab iridite after treatment

"PT" connectors accommodate about three times as many circuits, size for size, as comparable "AN" connectors. Like so many Bendix products, they are a result of the traditional Bendix policy of anticipating the needs of the aviation industry, in this case the trend to higher voltages and smaller conductors.

*TRADEMARK



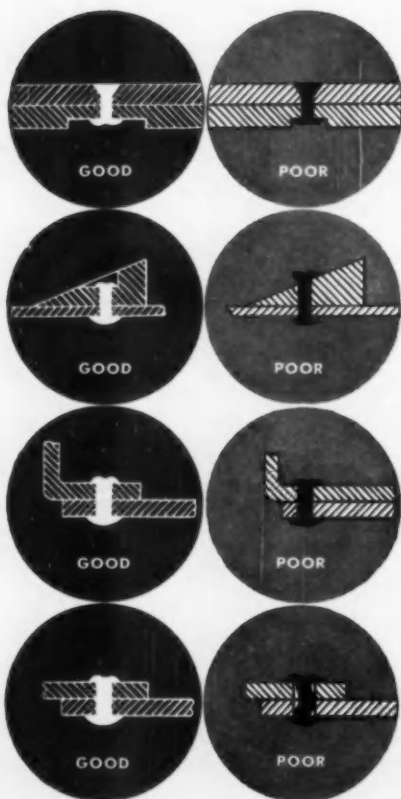
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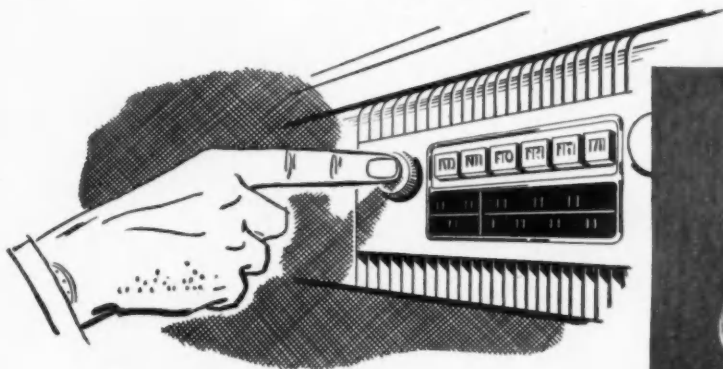
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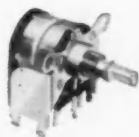
with this **MALLORY**
Pull-on... Push-off switch



GONE ARE THE DAYS of a car radio warming up to blast you out of the car while you fumble for the knob . . . and gone are the days of a car radio being turned on and running for hours, unheard because the volume control was not turned far enough!

The modern car radio is equipped with the new Mallory push-pull switch. Pull the volume control knob . . . with a gentle click, it's on—and the volume control setting is the same as when last turned off. Touch a finger tip to the face of the knob . . . with a gentle click, it's off—and the volume control setting remains unchanged for the next time the set will be used.

Mallory pioneered the vibrator which made auto radios practical. Now . . . Mallory has made it possible to add car radios to the growing list of controls and accessories that can be push-button controlled. This unique feature is just one more example of how manufacturers can depend on Mallory for the very latest design advancements in automotive radio components.



And a new Mallory volume control for transistor radios

This new control by Mallory has been especially designed for use in transistor receivers. It features extremely low "hop-off" resistance for smooth, precise control of transistor circuits at low volume levels. Another Mallory advance-design component for modern automotive listening pleasure.

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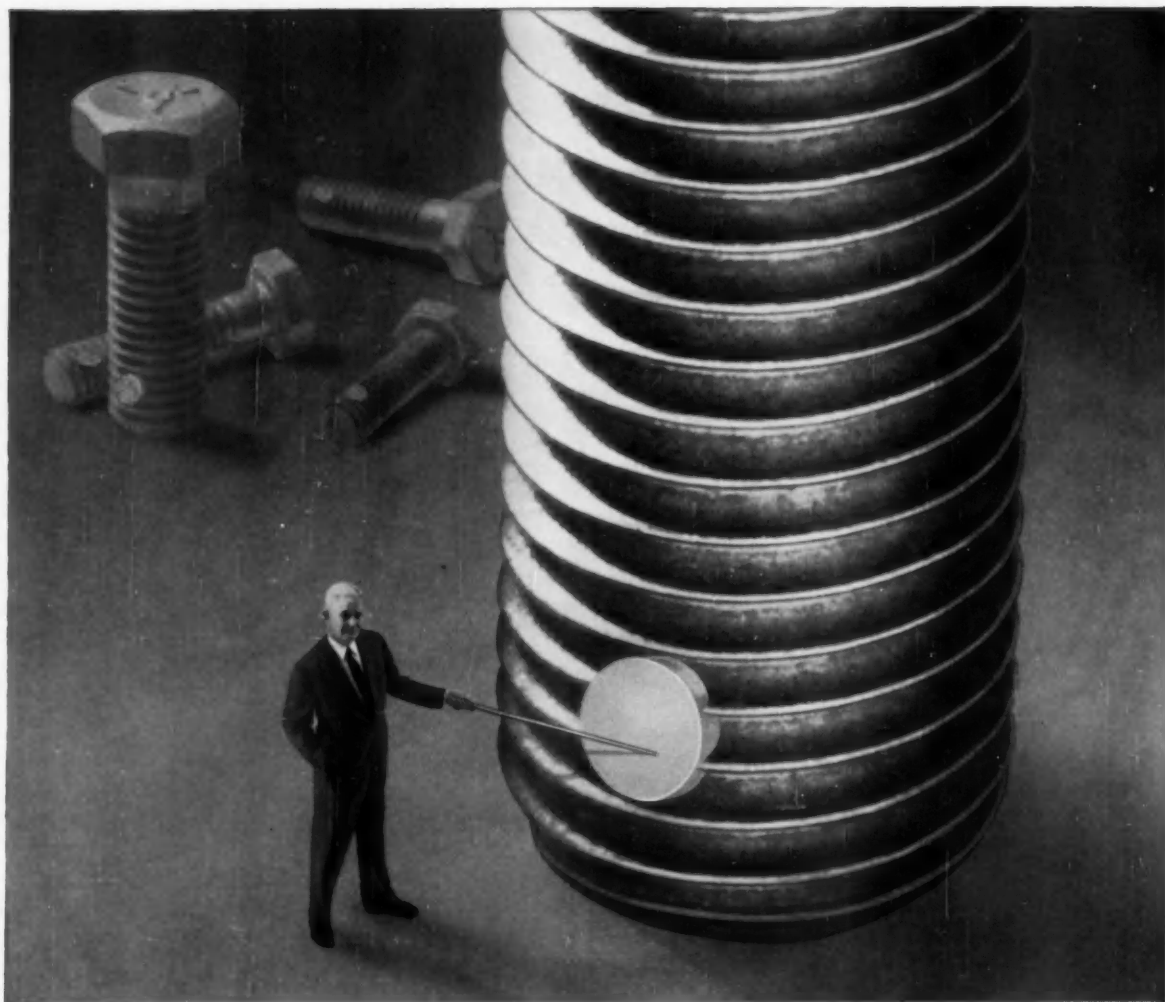
Parts distributors in all major cities stock Mallory standard components for your convenience.



Expect more... get more from

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Cleveland Nylok self-locking hexagon head cap screws hold tight, speed production, simplify design

NOW STOCKED IN ALL STANDARD SIZES FROM 1/4 TO 1 INCH

A Cleveland Nylok* hexagon head cap screw is self-locking—won't work loose. The locking device is a tough, resilient pellet of nylon that forces the mating threads together in a secure metal-to-metal union. All auxiliary locking devices are eliminated. Seated or unseated, the screw locks wherever wrenching stops. And because of "plastic memory," the pellet tends to recover its original shape and the screw can be used repeatedly.

These self-locking cap screws give uniform torque and will not gall or damage

threads or seating surfaces. They are not affected by aging or by temperatures from -70° to $+250^{\circ}\text{F}$. Further, when screws are properly seated, the locking pellet functions as a liquid seal.

You will save on production time when you use Cleveland Nylok self-locking screws. In addition, you can simplify design and reduce size, weight and inventory. Contact your Cleveland distributor for these self-locking screws in all standard sizes from 1/4 to 1 in., in high carbon quenched and tempered steel (C-1038).

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Write today for your copy of the Cleveland Nylok folder giving complete technical data and specifications on self-locking hexagon head cap screws. We can also supply other standard and special screws with the Nylok self-locking feature.



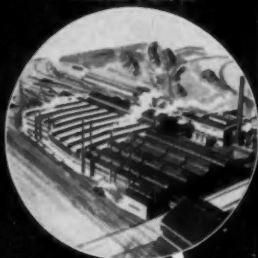
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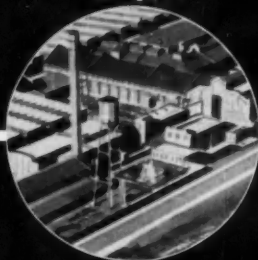
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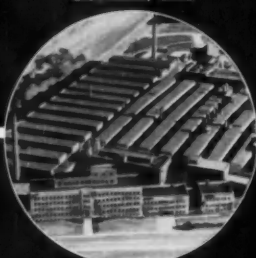
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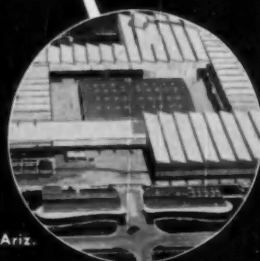


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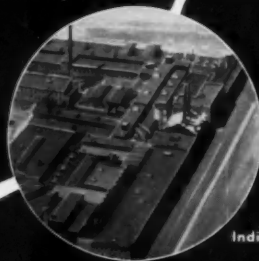


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• Most companies—probably yours—pursue a “multiple source” policy to keep production lines humming. And with National you can continue this policy with several “plus” advantages.

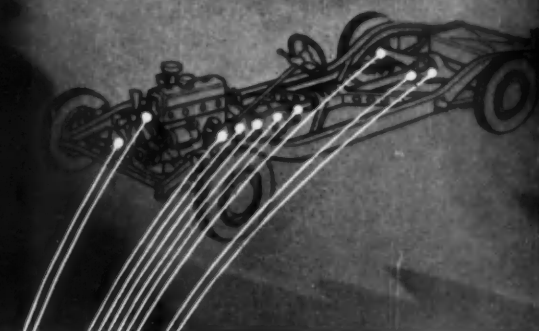
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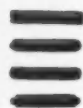
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*Oldest in age
Still in
the lead*



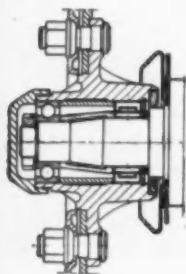
loose needles



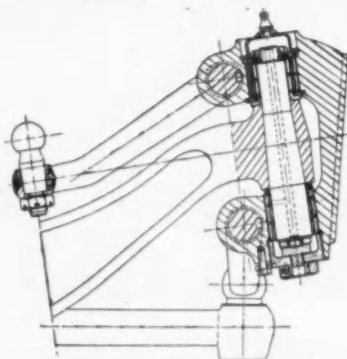
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complete bearings



WHEEL HUB



KING PIN (FRONT AXLE)



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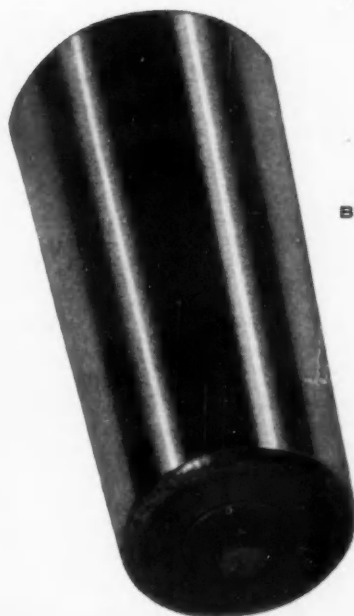


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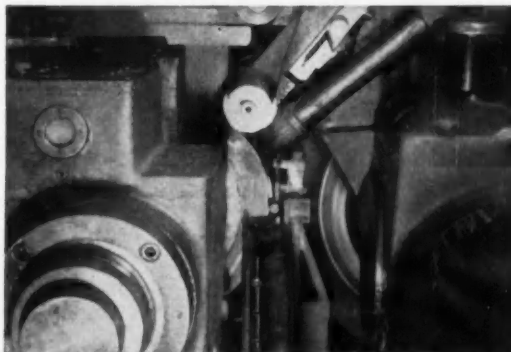
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PRECISION parts by the thousands can be surface finished . . . at high, continuous rates. The method . . . Osborn Centerless Brushing . . . is fast, economical.

Cylindrical parts are fed past a revolving Osborn Matic® Brush. Surface finishes are refined to low microinch readings, grinding burrs are removed and surface junctures blended to reduce stress concentrations.

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AUTOMOTIVE INDUSTRIES, September 15, 1957

193

Designed for Strength and Safety



STRENGTH AND SAFETY are built-in features of this seat-belt buckle made from Republic Stainless Steel, Type 201. Fabricating operations include: shearing into blanks of .125 thickness, punching, a severe bend of 175° to form the hook.



SAFETY ASSURED by designing the high strength advantage of stainless steel into the simple beak-type buckle. No intricate springs or mechanisms to fail at the wrong moment. Both belt and buckle are rated 1000 pounds in excess of CAA specifications.

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Here are the facts on a new and cost-cutting use of Republic ENDURO® Stainless Steel, Type 201, by Bunke-Musser Company, Jackson Center, Ohio, manufacturers of safety seat-belts for the automotive industry.

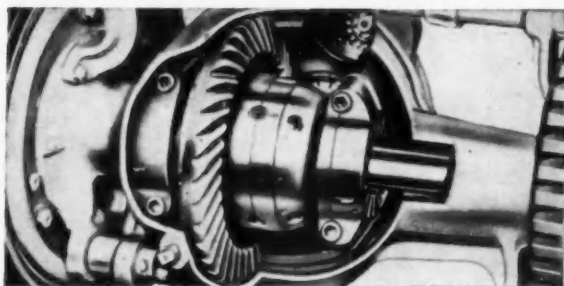
The most critical part of the entire assembly is the buckle. It must conform to Associated Seat Belt Manufacturers' specifications. These require that the buckles be subjected to a test pull of 1500 lbs., then reduced to 125 lbs. At this point, the pelican hook of the buckle must be capable of release at 45 lbs. pressure.

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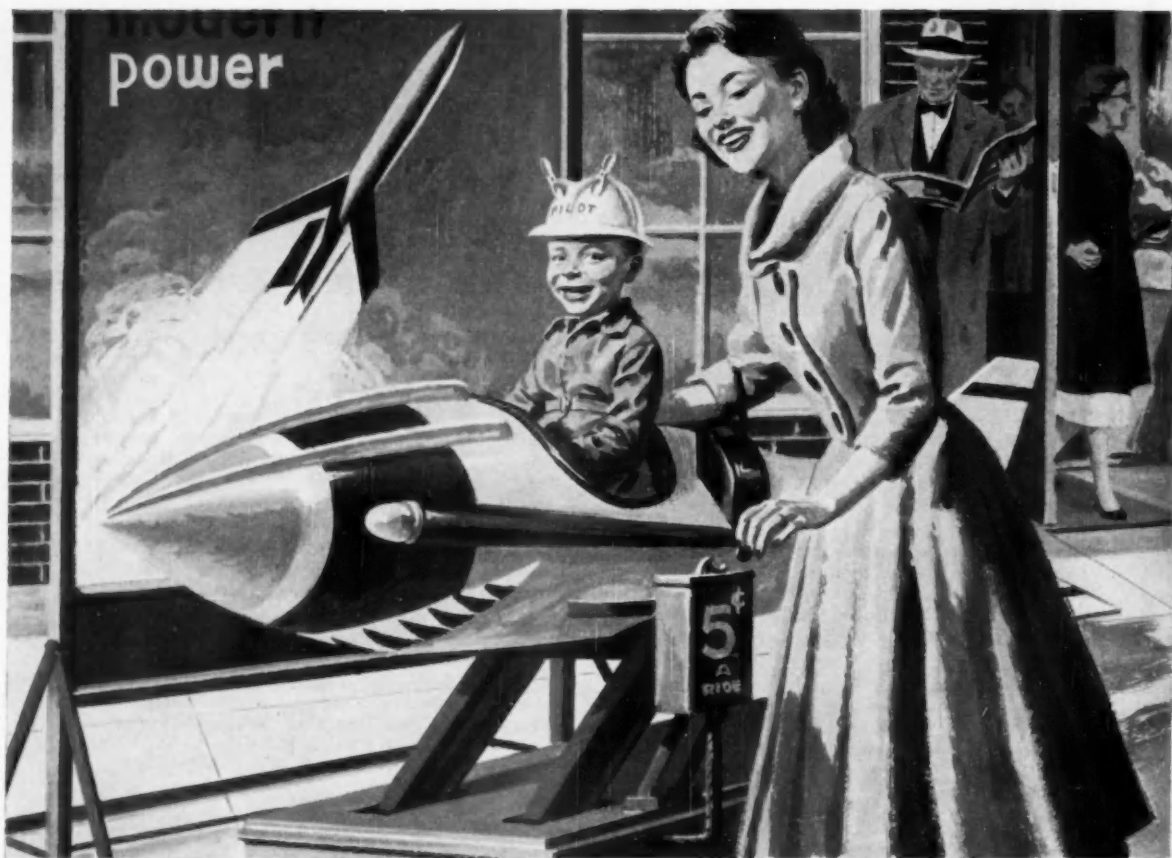
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Multipress curbs costs of Dormeyer mixer parts . . . triples output by integrating three separate operations

Often, a series of operations can be combined to both improve product quality and cut production costs. This was the experience of Haber Corp. when they streamlined production of beater spindles for their Dormeyer automatic food mixers.

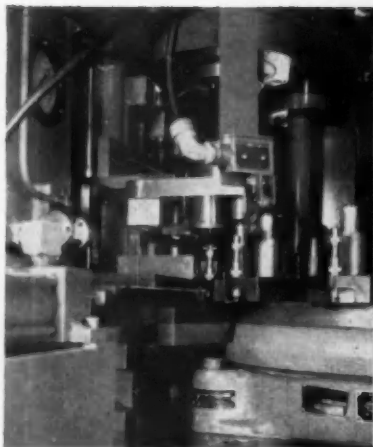
By reducing the size variations of slots cut into the spindles and thus eliminating the need for deburring, quality was boosted . . . costs cut.

A special 8-ton hydraulic Multipress was selected to combine three machining operations. Only loading parts on the 12-station hydraulic index table is performed manually. Once the cycle-start button is pressed, the parts advance step-by-step until a small flange-mounted cylinder ejects the finished beater spindles.

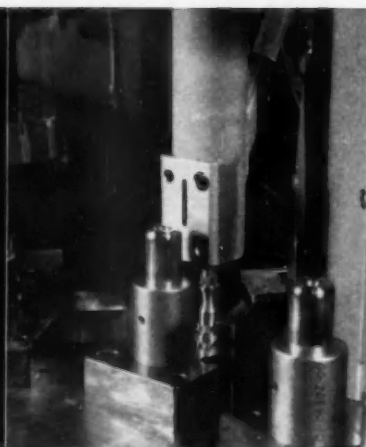
In separate manual operations, production rates of from 200 per hour for cutting slots to 450 per hour for deburring had been standard. With Multipress, a continuous flow of 1020 beater spindles per hour is achieved with only one operator.

Advance cost analysis estimated that equipment and tooling would be amortized within a year due to increased production and quality. Actual production proved this estimate too conservative.

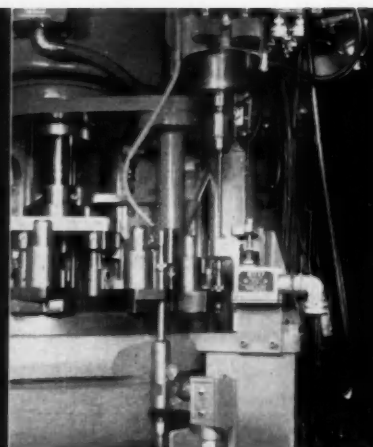
Find out how Denison hydraulic Multipress can perform a three-in-one job for your company—improving quality, speeding production and cutting costs. Write to Denison Engineering Division, American Brake Shoe Co., 1212 Dublin Road, Columbus 16, Ohio.



Ram descends to shear four slots, then holds down under full pressure as side cylinder advances broach for .050 slot. Chips are trimmed at next ram station.



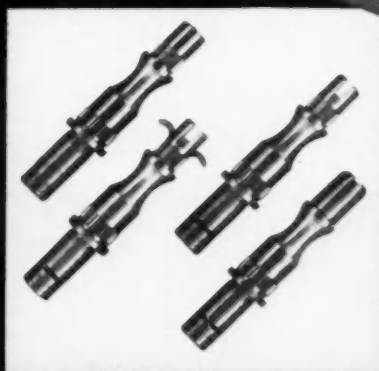
Next, spindle receives hopper-fed sleeve under transfer mechanism. Sleeve is pressed over spindle end by a cylinder activated by descending ram.



In final operation, spindle is clamped and center hole reamed through by drill head. Flange-mounted cylinder then ejects spindle from fixture.

hydraulically

8-ton hydraulic Multipress equipped with 12-station index table. Index table is mounted over special bolster on 22-inch work circle, to which is attached one-ton capacity, foot mounted hydraulic cylinder with 12-inch stroke.



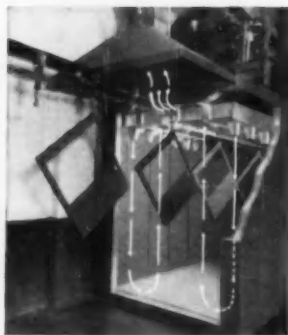
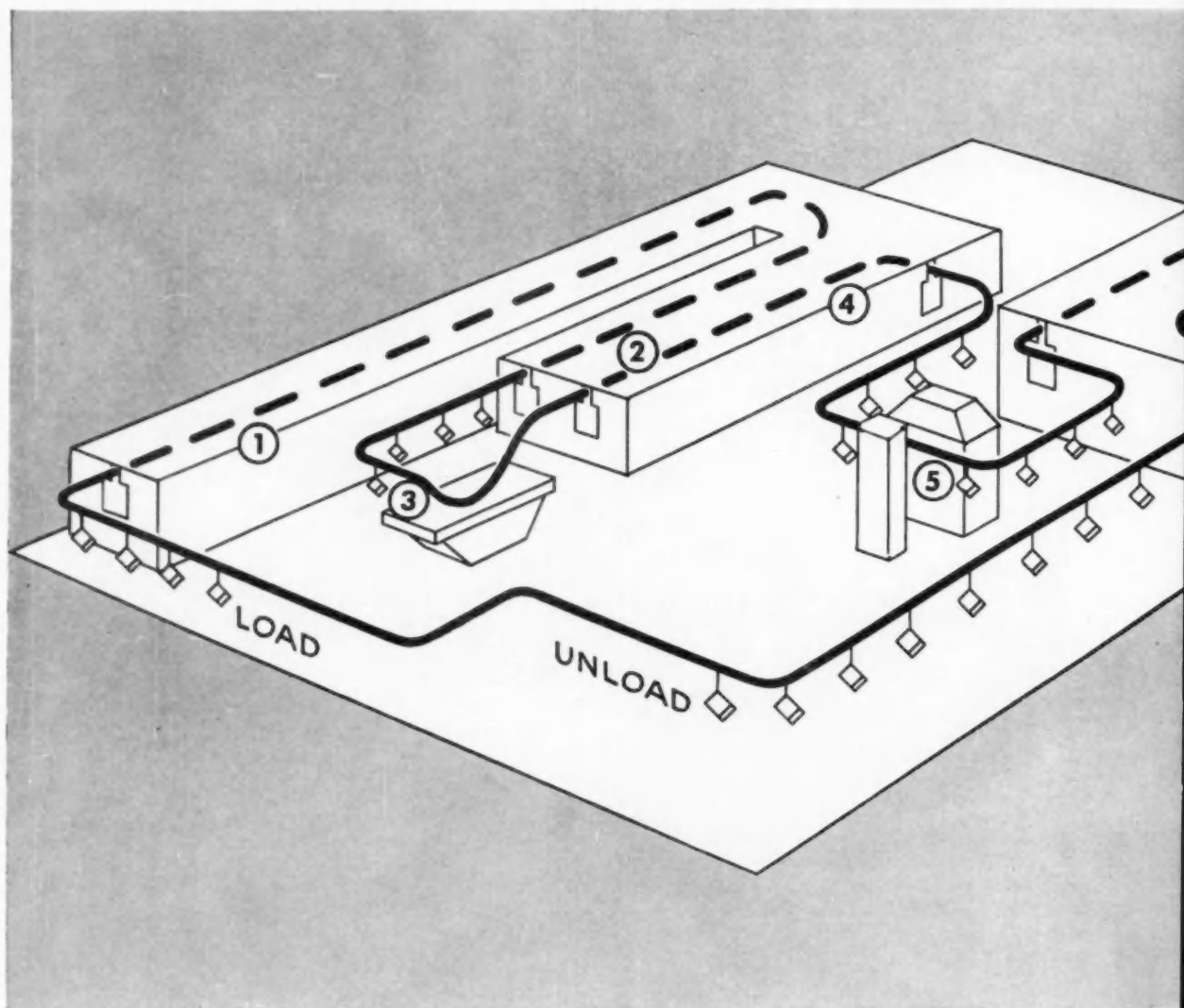
Various machining stages illustrated: (left to right) spindle prior to slotting; after shearing slots, showing chips; after trimming of slots; with sleeve pressed into place.

Denison, Denison HydrOILics, and Multipress are registered trademarks of Denison Eng. Div., ABSCO

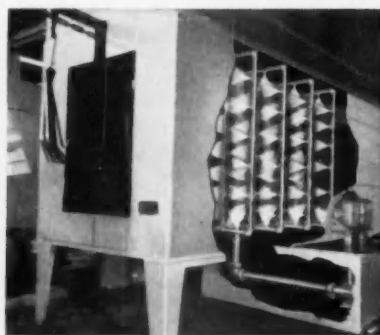
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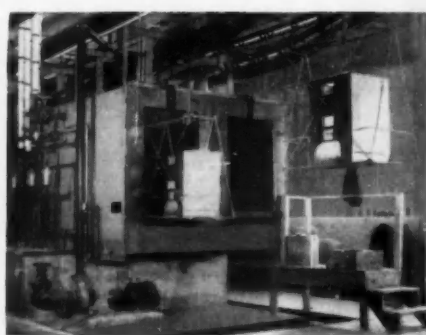
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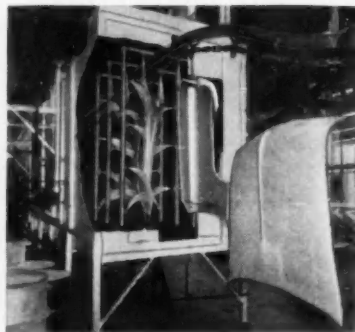
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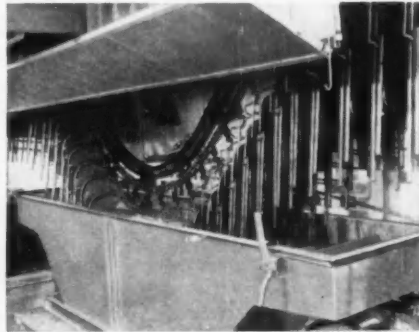


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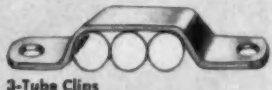
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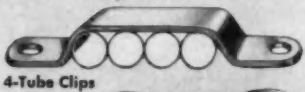
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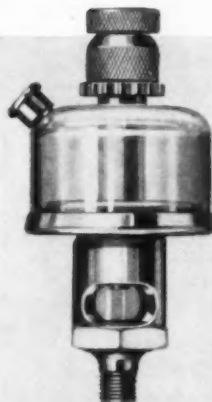
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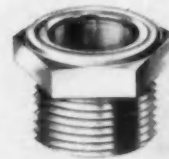
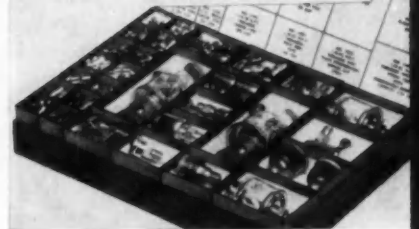
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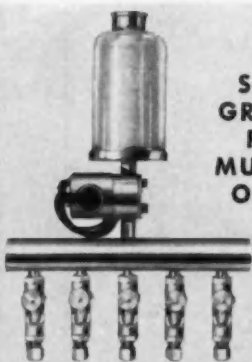
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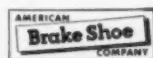
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THE VELLUMOID COMPANY

Worcester, Massachusetts

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Seat with the Milisco
"LIFT-N-TILT" Feature



SWIVEL ACTION
BACK REST

LEATHER COVERED
FOAM RUBBER SEAT

FORE AND AFT
ADJUSTMENT

LIFT-N-TILT
ADJUSTMENT

VERTICAL
ADJUSTMENT

SWIVELS TO FOUR
90° POSITIONS



Operators like the Milisco patented "Lift-N-Tilt" feature of the "Sentry" seat. The spring-action lever allows for quick tilt adjustments. Complete with fore and aft adjustments also.

The Milisco "Sentry" Seat, truly the most versatile pedestal seat on the market, provides for maximum riding comfort and gives that extra sales appeal that has made the "Sentry" the "accepted" pedestal seat for panel trucks, cranes and shovels and other types of mobile equipment.



where your
seating dollar
goes farther

2730 N. 33rd St., Milwaukee 45, Wis.

HEAVY DUTY D. C. SOLENOIDS

MODEL SS

VOLTAGES . . . (D.C. Only)
6V. 12V. 24V. 32V.

CURRENT DRAW . . (Pulling)
50A. 30A. 17A. 7.5A.

CURRENT DRAW . (Holding)
1.7A. .95A. .28A. .25A.

DUTY Continuous

CYCLES . . Not to exceed 6
per minute

PULL . . Approximately 10 lbs.
over 1/2" stroke

WEIGHT 2 1/4 lbs.



Model
SS

MODEL SD

VOLTAGES . . . (D.C. Only)
12V. 24V. 32V. 115V.

CURRENT DRAW . . (Pulling)
31A. 26A. 16A. 3.6A.

CURRENT DRAW . (Holding)
.60A. .31A. .19A. .07A.

DUTY Continuous

CYCLES . . Not to exceed 6
per minute

PULL . . Approximately 10 lbs.
over 1 1/2" stroke

WEIGHT 4 pounds



Model
SD

SYNCHRO-START PRODUCTS, INC.
8151 N. RIDGEWAY AVE., SKOKIE, ILLINOIS

"TORQUE WRENCH" MANUAL

Sent
upon request

Formulas
Applications
Engineering data
Screw torque data
Adapter problems
General principles



P.A. STURTEVANT CO.
ADDISON QUALITY ILLINOIS

Manufacturers of over 85% of the torque wrenches used in industry

CLEAR-O-MATIC*

The All-Temperature Piston

UNIFORM SKIRT CLEARANCE FROM 20° BELOW ZERO TO 200° F

STEEL TENSION MEMBER

Anchored only at pin bosses
and cast in positive contact
with I.D. of piston skirt

Controls Clearance Automatically



DESIGN ADAPTABLE TO FULL
SKIRTED OR SLIPPER TYPE
PISTONS FOR GASOLINE EN-
GINES FOR EVERY PURPOSE

Sensational Performance

Requires less than .001 Clearance

Cold or Hot, Clear-O-Matic Piston clearance stays constantly uniform. Required clearance is reduced to less than .001. This great development of the "All-Temperature" Piston by Zollner engineers provides another fine feature attraction for the modern motor car . . . smooth, quiet running engine . . . no cold slap . . . reduced friction without loss of durability or heat conductivity . . . no danger of scuffing or seizing. We suggest a test of these sensational performance advantages for your engine.



- 1 Clearance maintained uniformly at all coolant temperatures from 20° below zero to 200° F.
- 2 Effective expansion identical with ferrous cylinder.
- 3 Steel tension member, with same effective expansion as cylinder, maintains uniform skirt clearance through entire temperature range.
- 4 Normal diametric clearance usually less than .001 with uniform skirt bearing.
- 5 Durability and conductivity comparable to heavy duty design.

*T.M. Reg. Pat. App. For

ADVANCED
ENGINEERING
PRECISION
PRODUCTION

COOPERATION
with Engine
Builders

ZOLLNER

PISTONS

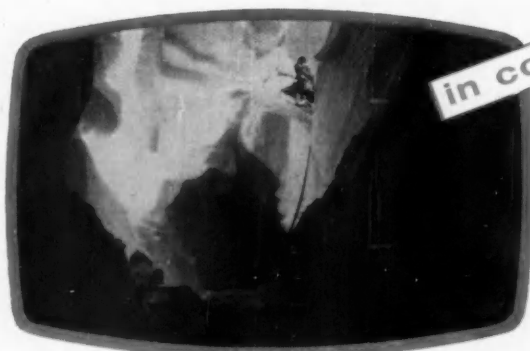
THE ORIGINAL EQUIPMENT PISTONS

ZOLLNER

ZOLLNER • Fort Wayne, Indiana

SEE TIMKEN TELEVENTS ON NETWORK TV

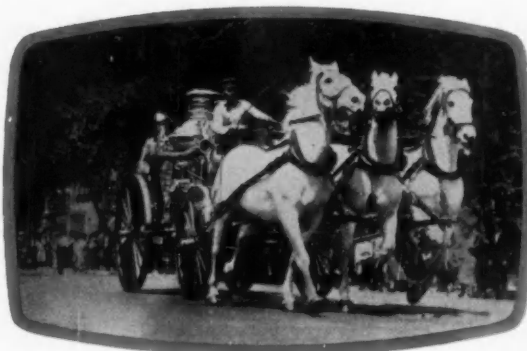
Two big hour-long spectacles this fall



in color

Over 126 NBC STATIONS, SEPTEMBER 23rd

"Eleven Against the Ice", the story of the Antarctica Turnpike. See men and machines build a trail across Antarctica's frozen wastes—in spite of 200 mph winds, temperatures of 120 degrees below zero and crevasses big enough to swallow a 20-story building. It's a triumph of engineering and human courage, a whale of a television show.



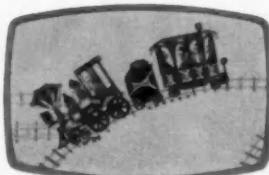
Over 142 NBC STATIONS, NOVEMBER 21st

"The Innocent Years". Recaptured from exciting old films and newsreels, you'll see happy days relived. Experience the excitement of "Teddy" Roosevelt, Thomas Edison and Mark Twain in action. Hear songs like: "In the Good Old Summertime", "He'd Have to Get Out and Get Under". Enjoy the fun of family picnics, the joys of people in the last untroubled time in our history.

And commercials that help you sell . . .



See How man stumbled on the concept of the wheel.



See Why America's railroads have always led the world.



See Why Americans jump for the latest thing in cars.



See One man push a freight car all by himself.

Years of national and trade advertising, backed by their superior performance, have made "Timken" the best-known name in bearings—a name that helps to sell the products that use Timken® bearings. Now, network

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TIMKEN TAPERED ROLLER BEARINGS

TRADE-MARK REG. U. S. PAT. OFF.